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**INDIAN CORN (ZEA MAYS.)**

**DWARF VARIETY.**

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# FOOD FOR THE MILLION.

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**MAIZE AGAINST POTATO.**

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**A CASE FOR THE TIMES:**

COMPRISING THE

**HISTORY, USES, & CULTURE OF INDIAN CORN,**

AND ESPECIALLY SHOWING

THE PRACTICABILITY AND NECESSITY OF CULTIVATING

THE DWARF VARIETIES,

**In England and Ireland.**

**BY AMICUS CURIÆ.**



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**"GIVE US SEED THAT WE MAY LIVE AND NOT DIE, THAT THE LAND  
BE NOT DESOLATE." Gen. xlvii, 19.**

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**LONDON:**

**LONGMAN, BROWN, GREEN, AND LONGMANS;  
AND F. PAWSEY, IPSWICH.**

**1847.**





**By Permission,**

**TO THE**

**RIGHT HON. SIR ROBERT PEEL, BART. M.P.**

**UNDER WHOSE LATE ABLE ADMINISTRATION**

**THE REVENUES OF THE NATION, AND THE RESOURCES OF THE WORLD**

**WERE MADE AVAILABLE,**

**FOR THE EXIGENCIES OF THE STATE, AND THE EMERGENCY OF FAMINE,**

**This Treatise,**

**ON THE SUPPLY OF FOOD FOR THE PEOPLE,**

**IS RESPECTFULLY DEDICATED BY HIS MOST OBEDIENT**

**AND HUMBLE SERVANT,**

**THE AUTHOR.**

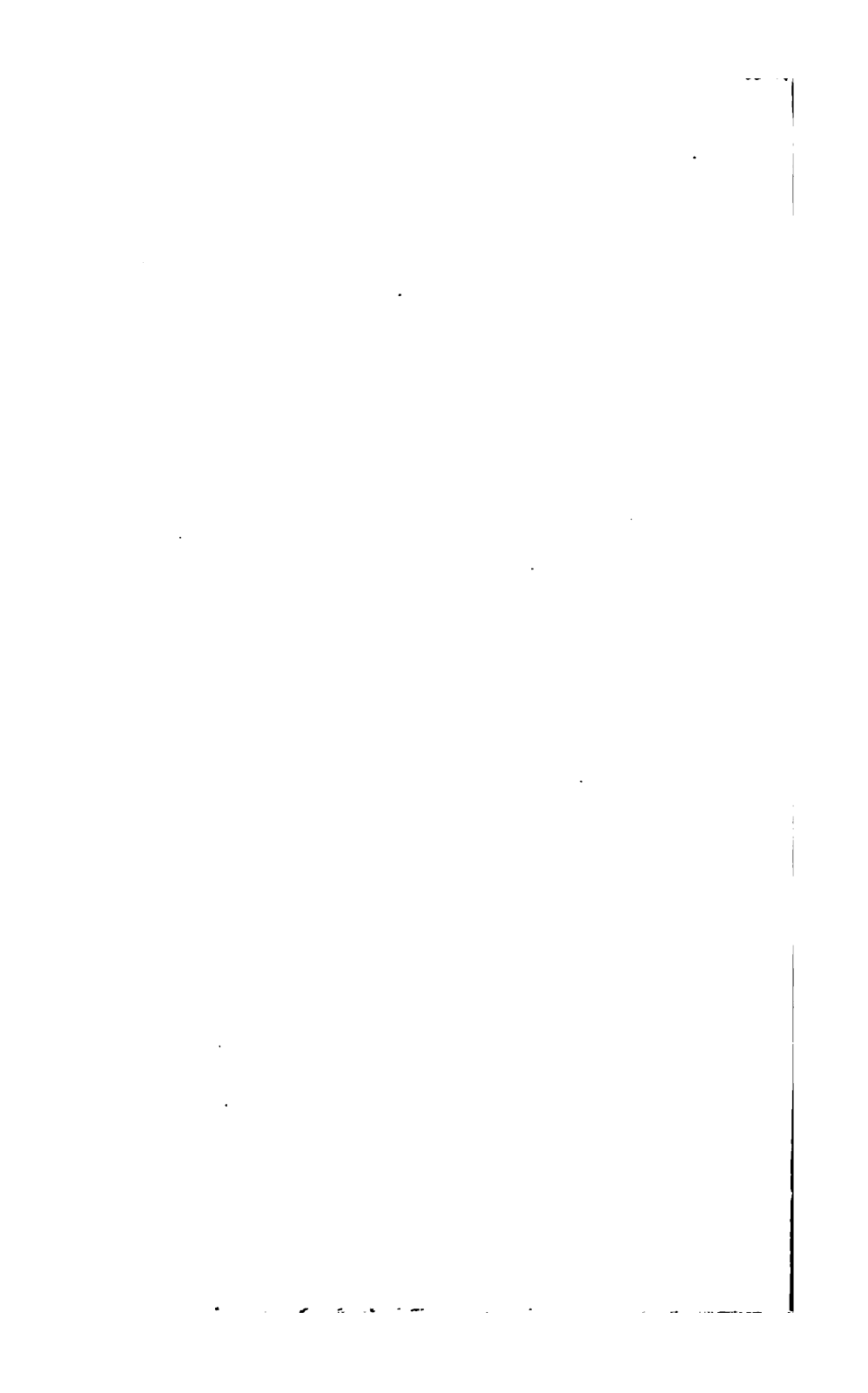
*January, 1847.*



## TO THE READER.

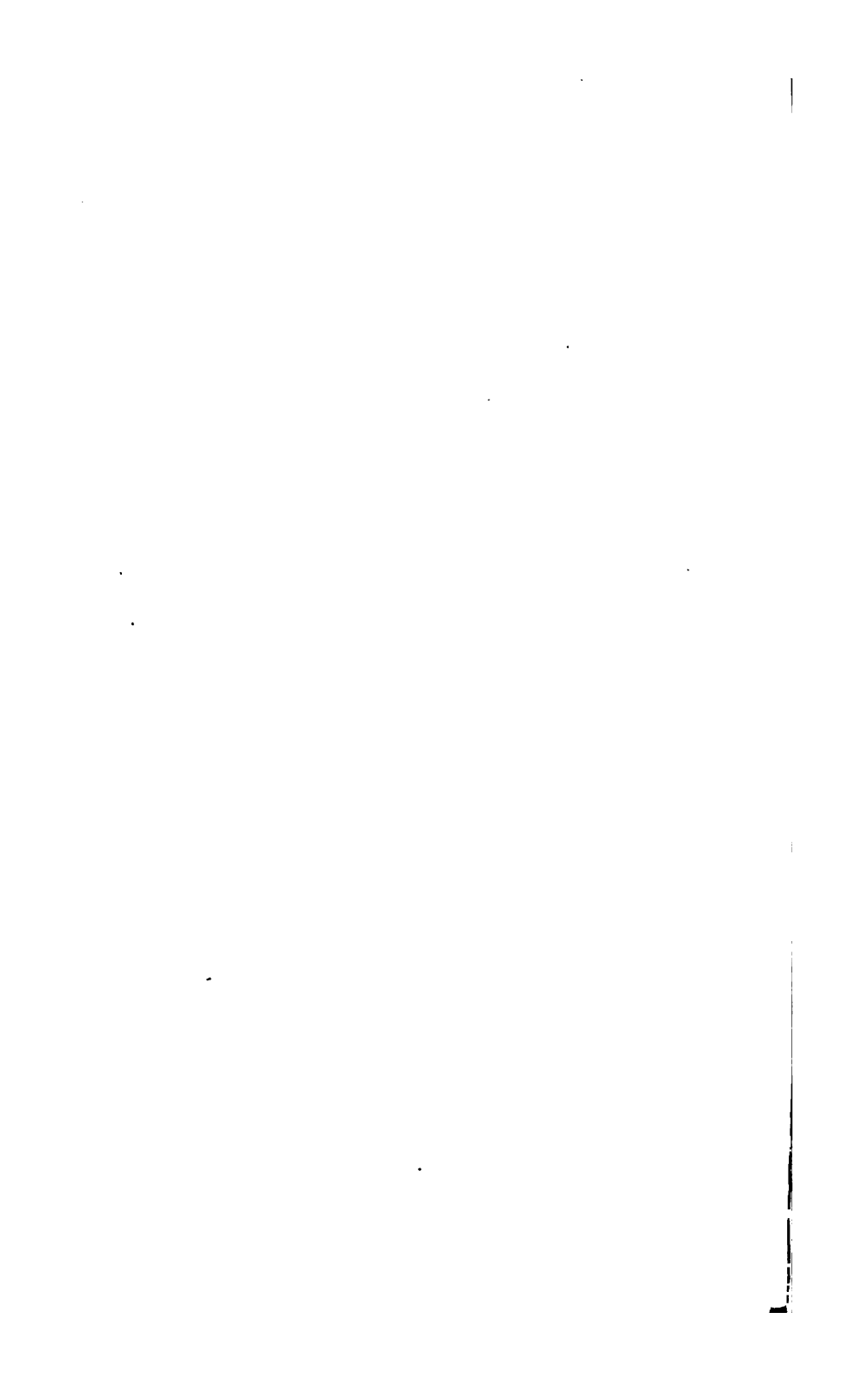
The following papers were commenced in the month of October last year, with the view of bringing them before the public in another shape. The failure of that object delayed their completion ; but a further pursuit of the subject confirmed the author's views, and the course of events appeared to make its consideration the more important. Hence the appearance of the present publication, which is submitted to the public with a mingled feeling of confidence and diffidence,—the importance of the question inspiring the one, and its treatment inducing the other.

*January, 1847.*



## CONTENTS.

CHAPTER I.	
	PAGE
Introductory and general observations .....	1
CHAPTER II.	
Description and history of the genus of grasses producing Indian corn .....	14
CHAPTER III.	
The several kinds of maize, and the practicability of cultivating some of the hardier sorts in England, considered .....	35
CHAPTER IV.	
The consideration of the practicability of cultivating Indian corn in England continued, and shown to accord with experience	61
CHAPTER V.	
The uses to which Indian corn is applicable, chiefly as an article of human diet, and food for domesticated animals .....	82
CHAPTER VI.	
A description of the kinds of maize best adapted for English tillage, and the mode of cultivating them .....	111
CHAPTER VII.	
On the management of maize whilst growing, and the manner of harvesting and storing the crop; with the mode of cul- tivating it for fodder, and concluding observations .....	137



# FOOD FOR THE MILLION.

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## CHAPTER I.

### INTRODUCTORY AND GENERAL OBSERVATIONS.

It is a source of great congratulation to the country and deeply gratifying to the philanthropist, that the Art of Agriculture is at length emerging in England from her long protracted minority and pupilage; and in alliance with science, is steadily advancing into her majority, if not maturity; a state which, when attained, may, in accordance with well-known analogies, be confidently predicated to continue for a period of proportionate endurance. If this be so, the future is full of promise to the nation. That knowledge, the ardent pursuit of which is so cheering a characteristic of the age, now extends her hundred hands to help in the cultivation of the earth; and the practical application of the useful sciences, especially of the beautiful and important truths of chemistry, has long though silently been at work, in exciting and increasing the fertilizing powers of the various soils beneath our feet, and is now rewarding us with the fruits of experienced benefits.



The serious and interested attention of all classes is being concentrated upon this vital branch of our industry, this great foundation of a people's prosperity. On this, as on a fulcrum, ought commercial enterprise to be placed, to move the world and make its wealth our own—Labour, to produce, must needs have food. The man of rank, whose broad acres yield him produce in the shape of rent, and the tenant, whether a gentleman or yeoman, who reaps a harvest by their tillage, are alike learning to join in the pursuit of agriculture, as a matter of thought, as well as of manual craft.

Political events, which it is not our purpose to discuss or trace, have of late likewise powerfully tended to direct our attention to the great question of tillage, and the Egyptian cry, of "give us bread," has again reached us from a land, whose green fields but wait to be ploughed to reward its peasantry with abundance. Whilst God has providentially ordered by the provision of a bountiful harvest of wheat, that the staff of life should not fail in England, He has seen fit to threaten Ireland with famine, through the blight of its principal crop, the potato; on which thousands of its crowded and ever ill-fed population wholly depend, with their hordes of pigs, for necessary sustenance.

It is a grave question, which has been at times discussed by the philosopher and philanthropist, whether the introduction of that over-lauded tuber

has not cursed instead of blessed the Irish people; it has now become a deeply important consideration to the political economist, and is presented in a double point of view, morally and physically; for the facility of its culture has but hitherto induced improvidence and laziness, and when produced it affords but little nourishment as a main article of daily food. The Irish peasant is not the sturdy and robust labourer usually represented, or, if he were, it would have surely been in *spite* of the potato and not in virtue of it; should proof be wanted, witness the shoals of poor fellows who come over every harvest to fatten. In England the root is chiefly eaten as an adjunct to a more solid and nutritious aliment (the only proper use of it as human food in a northern climate, although even then inferior in point of nutriment to peas, carrots or turnips,) but in Ireland it is the almost exclusive diet of the peasantry throughout the greater portion of the year; wheaten bread and butcher's meat being but a rare luxury, and oaten cakes by no means a general fare, to those unfortunate creatures, upon whose destinies the action and re-action of a complex counter-change of causes, moral and religious, physical and political, have so long worked and wrought so woefully.

The government and the people of that portion of the empire, which has been blessed with increase, have earnestly and benevolently exerted themselves to provide a remedy, and avert the impending distress

of the sister island; may we never slacken in the work of charity, nor give begrudgingly of our abundance; but whilst past calamities are cared for, it behoves us to neglect no means by which, if possible, a like extremity may be averted for the future, to leave none untried to lessen in coming years the probability of failure in the crops of a staple food.

In addition to the two-fold evil referred to, as resulting from the culture in Ireland of a plant which is, in truth, but a petted night-shade, the renewed attacks of a pestilent disease now forms a third, and threatens destruction to the crop, and famine to the peasants. But is it not in our power by a wise application of the knowledge we possess, and a judicious use of means within our reach, to profit by the plague, and out of the present evil to produce a future good? Would it not be well to seek some substitute for a tuber which, grown and relied upon in the manner practised by the Irish, has tended to debase its cultivators, and expose them to occasional starvation? have we entirely exhausted the edible stores which the teeming earth produces for our sustenance, and fostered by man's culture yields in a more perfect state? is there no other vegetable production of foreign lands, which might be introduced and acclimated in our own island with success, equal to that which has attended the experiments that naturalised from time to time, most of our garden and even agrarian treasures? Surely in the

country whence we derived the overgrown and now degenerated potato or in those other regions of the old world that have already afforded us fruits adaptable to our climate, some such product might be found, which, with due attention and skill, might be made to flourish here, and yield as valuable a harvest to ourselves as it gives to foreigners.

An affirmative may be unhesitatingly replied to each and all of the questions here asked ; and in particular it might be confidently asserted, that in the Maize or Indian corn (or as it is called in America, where it is most known and best prized, simply and emphatically " Corn ") would be found the object of our quest, the substitute we seek, the future food of our now potato-starved population, a grain superior to wheat in its increase, and second only in the nutrition it affords.

To such a source indeed in its ripened state, have our rulers had recourse in the present crisis, the dried grains of this prolific and nutritious plant, have already been imported in large quantities, and at a great outlay of the public money, to be ground into meal for the supply of those, whose potato stores failed ; but why should we not grow the grain at home ? Why not have it borne by our own fair fields, and save the gold which is now being given for its purchase ? that the English farmer might with both facility and advantage, naturalise a grass which is grown abroad, (under conditions much less

dissimilar to those which originally affected many of our now most valued, but borrowed productions) it is the purport of the following pages to maintain, if not to prove—that a great good would be conferred on all classes, and a rich harvest reaped by the grower, will be apparent on a statement of the facts.

Surely the physical capacities of the soil and climate of our country, ameliorated by culture, are such, and such its scientific resources, tried and untried, with the means and practical genius of its agriculturists, that to attempt is to achieve.

The importance of substituting a good sound nourishing diet, containing a fair proportion of gluten or sugar, for a poor, weak, watery apology for food, such as the potato, which yields little else than *starch*, need not be here enforced ; our chief engagement will be to shew that the substitute proposed for tillage as a staple national crop, is an esculent of excellent qualities, suited or capable of being adapted by culture to the English soil, and an English summer ; a position which will require but the spirit that excites skill, and the skill that rewards spirit, so conspicuous in our character, to establish it in practice, and cause a new era in our graminivorous products.

The writer's attention happened to be directed to the growth of Maize in this country as a garden produce, at the time when Cobbett so energetically advocated its claims for field cultivation. Further ex-

perience has tended to confirm the conclusions then formed. These not only coincide with those of the last named author; but with the views of a late regretted gentleman, whose valuable labours in the cause of horticultural and agricultural science, were unhappily terminated before he reaped the reward of his toils. Mr. Loudon expresses an opinion on the question of its introduction and cultivation in appropriate situations in England, favorable to a dwarf red variety of the plant, which will appear, on reference to the chapter devoted to a consideration of the subject, to be in accordance with sound conclusions and experience.

But Mr. Cobbett does not content himself with bestowing his patronage on Indian Corn—he does stout battle with the potato, the former he truly maintains as an excellent and most profitable esculent, yielding a wholesome grain, and a rich fodder; whilst the latter he denounces with some degree of truth, as well as much contempt and unnecessary abuse. A summary of his opinions on this root, occurs in an instructive book, and the least objectionable of his works, “the English Gardener.”—As it is short and free from objection, it is subjoined.

“*Potato*”—“I am going to speak here of this vegetable, as a thing to be used merely in company with meat; and not to be used as a substitute for bread, having proved, in various parts of my writings, and proved it beyond all contradiction, that,

*as a substitute for bread*, it is the most wasteful thing that can possibly be used. It has too, now been acknowledged by various writers, and it has been established by evidence taken before Commissioners of the House of Commons, that, to raise potatoes for the purpose of being used instead of bread, is a thing mischievous to the nation.

“As food for cattle or pigs, I know it to be inferior to cabbages, to swedish turnips, to mangel-wurzel, and to be much more expensive, weight for weight, than either of these articles. I know of no animal that will even *live* for any length of time upon uncooked potatoes, while I know that sheep and horned cattle will live, and even fat, to a certain extent, upon either cabbages, mangel-wurzel, or swedish turnips: and while, I know that pigs will live and thrive upon either of these articles, neither of which, weight for weight, demand half the expence that the potatoes demand—a mere vegetable or sauce, as the country people call it, it does very well to qualify the effects of fat meat or to assist in the swallowing of quantities of butter. There appears to be nothing unwholesome about it, and when the sort is good it is preferred by many people to some other vegetables of the coarser kind.”

The following comparison between the two chief articles of food to the Irish peasantry occurs in the recent work of an intelligent foreigner. “The Irish (he relates) generally assure the stranger when they

shew him their oat cakes, that these are a particularly wholesome, nourishing, and strengthening kind of food; which can be true only when they are compared with the watery, tasteless, and meager potatoes, upon which the Irish love to subsist." When the poor fellows have fed through the winter on Indian meal we shall find them boasting in like manner of their maize-bread, mush and homany.

Apart from this view of the subject, its liability to degenerate when propagated by cuttings and to rot in particular soils or at certain seasons, the effects of which are now pressing upon us with fearful forebodings, forms an argument for a full and fair discussion of the question "Maize or Potato?" which it would be unwise for us to neglect.

Some sensible and important observations on this matter occur in another work, one of a different stamp from the last, full of interesting papers on subjects of natural phenomena and much to be commended, "the Sacred Philosophy of the Seasons"—an extract bearing immediately on the question at issue may be profitably given—it contains not only sound philosophy, but prophetically points to the present crisis.

"It appears, however, from experience that when potatoes are raised in the usual way, they gradually lose their vegetative energy, and become liable to diseases and injurious influences, which, in their more vigorous state, they are able to resist. A tendency in the plant to degenerate, under the present



mode of culture has long been observed, and some farmers have been careful to renew it at intervals by having resource to propagation from the seed. But this useful practice has not been so generally attended to as it ought to have been; and at the present time (1837) in consequence of this neglect, much distress is occasioned among the lower classes, in various districts, by the failure of the crops.—The history of the propagating power of the tuber seems to be as follows. At the 3rd production from a tuber produced by a seed (for until then it does not come into full bearing) the reproductive power is in full activity—Then the produce is greatest, but the potato being at this stage in general watery and what is called waxy, is not esteemed very palatable for food. In a few years however by constantly re-producing from the tuber, the potatoes become less productive, but more dry and mealy. This progress goes on year after year, the roots always improving in quality, but diminishing in quantity, till at length, it should seem, that the vigor of the living principle, by this mode of treatment wears out, and the plant first becomes subject to disease, and alive to all unfavorable influences of soil and weather, and finally ceases to reproduce. This subject has not hitherto been attended to by scientific or even practical men as it deserves. A crisis in the history of this valuable esculent seems, however, at last to have arrived, which must force the subject on public observation.

'The curl,' a well-known disease, first alarmed cultivators. It began in Lancashire, where the potato was early cultivated, and soon spread over all the richest districts of the country. This seems to have been the earliest indication of decay in the reproductive powers, and the precursor of that more general failure with which the community is threatened. What would be the consequence of the extermination of a crop on which has depended so much of the comfort of the poor, and to the introduction of which so much of the rapid increase of our population during the last century may be traced, it is dreadful to contemplate."

It thus appears that to continue the culture of this root in the artificial and unphilosophical manner hitherto employed, is still further to promote its degeneration and induce disease, whilst to adopt the alternative mode by sowing the seed is to starve whilst the roots are reaching their fitness for food, and render its cultivation an unprofitable employment, by encumbering the ground with a plant that ceases to yield the farmer an annual return. The truth is, every departure from the principles of nature, is sure in the end to defeat its objects—by slicing the tuber we have, it is true, made this plant produce an annual return of edible roots; but, at the same time, its powers have been weakened and its constitution injured, so as to render it susceptible of disease, and an easy prey to any epidemic that an unhealthy season may generate.

In the compilation of the present treatise, originality of matter has not been so much sought as of adaptation of the facts, and a treatment of the question to be placed before the public—a fair and conventionally established use has been made of the labours and experience of others, by gathering from every source at hand, whatever materials could add to the sum of knowledge and enlarge the store of fact, as well to form a compendium and manual for practical guidance, as to confirm the views advocated, and test the positions maintained.

In other words the compiler candidly confesses that he has either borrowed, begged, or picked up on his way, as abandoned to the public, the principal number of stones, (if he may be allowed the figure) which compose the structure of this unpretending literary edifice, chiefly supplying from his own stores the mortar and cement necessary to fitly bind together and form the building, hewing and cutting the materials thus collected in such fashion and shape as he has thought best adapted to his purpose. How many authors indeed, if they were honest, must make the like confession! From the cradle we cull the ideas of others and, through life, appropriate the thoughts or borrow without acknowledgment, the opinions and sentiments of our neighbours, we cannot tell when, whence, or how. He must be in strictness, a bold man who can confidently avouch for the pure originality, by right of creation, of any one set of

opinions which he may happen to entertain on any given subject, or claim more than the kaleidoscopic faculty of producing an ever-varying series of new combinations, modifications, and adaptations of old materials, eliciting brighter lights or shaping newer forms from well chosen ideas.

This chapter has been written to avoid the uninviting formality of a preface, and the last observations were added to save the parade of scheduling authors or citing references; but there remains one final remark in order to prevent the possible occurrence of a prejudice in reference to Cobbett's name; although free use will be made of the facts, and experienced opinions dictated by a shrewd common sense contained in his work, which lie imbedded and mixed up like good ore in worthless clay; yet especial care will be taken to avoid his objectionable style and tone, and by expunging those impertinent irrelevancies and offensive obtrusions which disfigure his pages, to preserve only such really valuable portions of his book as may be suitable for the present treatise.

## CHAPTER II.

DESCRIPTION AND HISTORY OF THE GENUS OF GRASSES  
PRODUCING INDIAN CORN.

“The standing definition of this plant is according to the following formula—that it is one ‘commonly cultivated in the warmer climates of the world, where it answers a purpose similar to that of wheat in the northern countries,’ or as it is elsewhere stated, ‘a plant which will not ripen its seeds fully in high northern latitudes.’ Whilst regarding its qualities in reference to this comparison, it is observed by a writer, of the last century, on Agriculture in France, that “where there is no maize there are fallows, and where there are fallows the people starve for want. For the inhabitants of a country to live upon that plant, which is the preparation for wheat, and at the same time to keep their cattle fat upon the leaves of it, is to possess a treasure for which they are indebted to their climate.”

The first of these statements is unsatisfactory, from its vagueness and heedless tone, as if it were of no consequence whether the inhabitants of northern countries possessed this vegetable treasure or not; and the last is tantalizing from its flattering encomiums on a product so much to be desired, but, as it

will be shewn, erroneously concluded to be beyond our reach;—the second, however, is more to the point, and inferentially more favorable to the inhabitants of the temperate latitudes, but its negative form leaves it of uncertain application. It will be desirable, then, to consider these positions more at length, and to investigate their claim to correctness; and after a review of the facts relating to the capabilities of the plant, its culture, and the influence of climate upon its growth, to take the liberty of reasoning and judging for ourselves. As a preliminary to these inquiries, it will be useful to consider it botanically, and to trace its connection with European agriculture.

Indian corn is the produce of the "*Zea Mays*" of Linnæus, a genus belonging to the natural order Gramineæ, an annual and herbaceous species of the Monœcian class (that is, having the stamens and pistils in distinct spikes on the same plant), with stout, reed-like jointed stems, reaching the height of 8 or 10, and even 12 feet,\* in some varieties, whilst in others not more than 2 feet high. It is, indeed, neither more nor less than a gigantic grass of vigorous growth. The leaves are flag-like, broad and long, hanging down alternately from large rough sheaths which surround the stem, and measure from 1 to between 3 and 4 feet in length, by 3 or 4 inches in breadth. The staminiferous flowers are disposed in

\* Some plants grown in 1828 at Kensington, attained this height.

several spikes, which, together, form a graceful tuft, standing clear of the leaves, and forming a feathery top, not unlike the head of a large reed. The pistilliferous flowers are arranged in numerous rows, on an oblong receptacle, placed in the axillæ of the superior leaves, and enfolded by sheathing bracts or husks; they compose the ears.—The seeds are solitary, and disposed in several longitudinal series along the spike as upon a common axis, instead of being contained in separate chests, as in the ears of wheat; each has a thread-like style, about 8 or 10 inches long, of a glistening light green color, a great proportion of which projects from the aperture of the enveloping sheaths, and, as there are some hundreds issuing from one ear, they fall down like a long flowing beard, or, as it is usually described, as a silken tassel. The ripe seeds, which are unusually large, and arranged in rows, generally 8 or 12 in number, are more or less compressed at the sides, according to the kinds, and flattened at the apex by the presence of the foliaceous husks, which tightly wrap them, and seem to be intended to protect them from the ravages of birds, or more insidious attacks of insects—in their friendly office of a shield, they entirely conceal the grains from sight, so long as the ear remains upon the stalks, and it is not till the dry husks have been stripped back that these are visible, when the spike appears like a short cucumber embossed with peas.

When quite ripe the grains are usually of a bright yellow, golden in some and paler in others; whilst varieties occur which produce them white, blood-red, and purple. The number of ears borne on one plant, varies according to the kind, being usually 3 or 4, often 5 or 6, not unfrequently 7 in many varieties, and even 9 or 10 in others. Each ear contains from 200 or 400 to as many as 800 grains, in the largest American kinds—an increase truly astonishing, and which, on calculation, presents a total unparallelled in the productive capabilities of the cereal grasses; and, moreover, when it is considered that a grain of maize is much larger than one of wheat, (being from the size of the largest pea to a horse bean,) this range of 1000 to 3000 fold, is more than doubled in the real value of its increase in a single plant, although its yield per *acre* will not, of course, be in the same proportion as that of wheat. That it is as nutritious and profitable when grown as it is prolific in its produce, will be shewn hereafter.

As to the name of “Indian corn,” this appellation seems to be of a kind of “*lucus a non lucendo*” origin, it being conferred by the discoverers of America on the occasion of finding it cultivated in the New World by the aborigines, whom they termed “Indians,” not because they came from India, but, as is well known, on account of their country being then supposed, by a strange conceit, to be a portion of



that coveted continent—an appellation still attached to the “red men” themselves: by them it is called “weachin,” and continues to be cultivated in those little patches of their own broad prairies yet saved from the merciless grasp of the white man.

The term maize (spelled also maiz and mais), is evidently a corruption of its specific botanical designation “mays,” and appears to be derived from the Greek *μαζα*, meaning bread.\* It has been long known by this name in Europe. In the United States of America it is simply styled “corn,” wheat, barley, and the other cereal crops being called by their specific names.

It has been generally accepted, as above intimated, that the maize is peculiarly a product of America, and that it was introduced into Europe by the discoverers of that continent; that is, on the notable occasion when a powerful and bellicose set of white men from the East, found a very productive country in the possession of a simple and peaceful people in the far West; ergo, before it was lost; but which they claimed on the plea of a grant made to them before it was found. This, by the way. But it will appear on investigation that another source and an earlier date for the introduction of

\* If the derivation proposed in the text be correct, that is Far Panis, “Zea mays” will be literally bread corn; the orthography of the second term, seems to be an old form for mais or maza.

this plant is to be assigned;—and its re-name of Indian or American corn has made a learned investigation of its father-land, an acceptable service in sifting fact from fiction. Even so great an authority as Sir J. G. Wilkinson, on matters of Eastern antiquities and remote Egyptian history; asserts that maize “was first discovered in Cuba by Columbus, in 1492;” and so entirely does he rely on that assumption as a fact, that he uses it with the force of an axiom, to rebut the strong assurances which he received, that specimens of this corn had been found in the ancient tombs at Thebes; and Reynier considered it necessary to vindicate its claims by writing a book on the “Asiatic origin” of the plant.

It may be taken as indisputable, that although the culture of maize in several new varieties, was established in the new world, on its discovery by Europeans, yet it is equally true, that in its other varieties, it had found its way long antecedently to that event, into southern Europe; but did not attract, as it would appear, much notice till after the voyage of Columbus; and hence, not improbably, arose the supposition that its culture was altogether owing to his introduction. The questions of when first introduced? whence? and by whom? are, however, involved in some obscurity, and raise an inference, that the gift was bestowed by those

early benefactors of our race who laid the foundation stones of civilization in the remote "olden times," the memorials of whose inventions and discoveries are inextricably involved in the mysteries of a forgotten mythology or in the attributes of a musty demigod.

That the culture of this, as of the other corn plants, whose origin is alike a mystery, was amongst the first efforts of mankind to make the willing earth bring forth yet more abundantly, is confirmed by the fact that no botanist has hitherto discovered it growing wild in any part of the world; the account reported by Auguste de St. Hilaire, that it had been found in Paraguay, rests only on the fact that some specimens were brought to him by the natives, who stated that they gathered them in the woods.

That this elegant and valuable corn-plant may be, however, considered as indigenous in Asia, where, in the fertile plains of Mesopotamia and the Assyrian valleys (if not in Persia and India) it has been immemorially cultivated as a staple food, is unquestionable, and will be further established when we come to examine certain references which are supposed to be made to it in the Bible. It was, moreover, from this centre, alike of the world's population, its civilization, and its faith, that a knowledge of maize was most probably conveyed to that early

and sister seat of science, the "shadowy land" of the Pharaohs, where the tradition of the circumstance appears in its present name of "*Syrian dourra*."

The assurance given to Sir J. G. Wilkinson that its seeds had been found in the mummy cases of Egyptian Thebes, if correct, would prove not only its early introduction there, but the esteem in which it was held by that curious and corn-growing people.

That it was also derived from the provinces of Turkey in Asia, whenever brought to the south of Europe, is a probable if not a necessary conclusion, as well from the fact that it is in some parts, as in France and Germany, still called "Turkish corn or wheat," as also from a consideration of the course in which the tide of civilization has flowed with the arts of life, from the Euphrates across the Hellespont, westward; or otherwise from Egypt to the ancient Grecian and Etruscan states.

A much later date than here assigned, has been conjectured, the Arabs or Saracens whose proficiency in the use of the plough, was as conspicuous as their prowess with the sword, are considered by some writers, to have brought the corn with them on their passage from the Red Sea to the Pillars of Hercules, and fostered its culture in their European settlements. But a more probable conjecture would assign it a previous introduction, and to the Romans

may be perhaps attributed the honor of giving us this prolific grain. These conquerors of the ancient world are well known in their enlightened policy to have carefully collected and cherished amongst their spoils of war, every new and characteristic product, animal, mineral or vegetable, of the countries they subdued. They were preserved alike to grace the triumphs that awaited the return of their victorious generals, and to contribute to what is, in these days happily considered a more noble triumph, the social welfare of the community and to increase the resources of their country. Hence it is, that Europe owes to these "rough nurses" many of her choicest productions and the preservation and introduction of many of the germs of our present civilization; and it may with reason be concluded, that amongst the other foreign products from their Eastern possessions, the seeds of the Zea, found flourishing in the rich plains of Syria, or crowding the fat valley of the Nile, were imported, as a valuable boon, to their corn-loving countrymen; the potato, happily, not being then discovered, nor the ingenious art of improving upon nature, by planting sliced tubers, invented.

Whilst throwing out this suggestion, it is proper to state, that no decided references to this species of corn have been found in any Roman or Grecian writer extant, and that moreover, a late French author cites botanists contemporary with the discovery of

America, who speak of maize as a then recent importation from Asia; but while this later fact would sufficiently establish its claim as a common product of both hemispheres, it is entirely inconclusive on the question of the first date of its introduction, inasmuch, as it might well be true, that it was imported direct from Syria to any given locality in Europe at the time quoted, and yet equally a fact, that it had been naturalised in other parts unknown to these botanists, long anterior to their time; railways not having been then contrived to condense space by condensing steam, nor to post news by lightning.

But be this, or the solution of the question of its *precise* Asiatic origin, what it may, it is a fact conclusively established, that a species of this valuable bread corn had an Eastern source, and was early in our Western history introduced into Europe, in several countries of which quarter of the globe, as well as throughout the whole continent of the two Americas, and in many parts of Asia, besides the provinces before referred to, Persia, Northern India, and Arabia, it is, to the present day, extensively cultivated. Along the Northern and Western coasts of Africa it is likewise found.

In Spain and Portugal, (where however much of the grain now grown has been probably derived from their South American Colonies,) and in Italy and even Switzerland and Germany, it has been long

esteemed an essential article of consumption by the inhabitants—much of their bread is made from it, and the grain in various ways, constitutes a large portion of the food of the masses.

It may not then perhaps be too extravagant a position to maintain, with a slight modification, the assertion by Cobbett, that the cultivation of "Indian Corn is doubtless as old as the world itself," say, since the husbandry of Noah; nor too much to consider that this assumption is countenanced by a fair understanding of many Biblical passages, referring to the uses, culture and levitical canons respecting the plant, which is translated in our version of the scriptures by the generic word "corn." It seems probable that the sacred writers, in some at least of the texts alluded to, spoke of this particular plant alone, and not of wheat or any similar kind of grain, as has been rather taken for granted than established as certain. With this view, a sober criticism of a few passages from the Old Testament, may be relevantly and profitably considered.

In the second Book of Kings, 4th chapter, 42nd verse, we read that "there came a man from Baal-shalisha and brought for the man of God bread of the first fruits, twenty loaves of barley, and full ears of corn in the husks thereof, and said, give unto the people that they may eat." Now on the supposition that the inspired writer is really referring to ears of

wheat, be it that of Heshbon or of Egypt, it certainly sounds to us strange that it should be offered in that state to the people to eat, and in company with bread, as it may be considered of wheat, and loaves also of barley. It may be remarked too, that, to speak of the full ears being in the husks thereof, is at least a singular phrase to use in reference to wheat; inasmuch as it is rather the grain than the ear which is there in the husk. But, for the sake of argument, suppose it was an ear of maize (equally a product, as has been proved, of Palestine,) which was here intended by the word translated "corn" in our Bible, all difficulty vanishes—nothing is more natural and appropriate, either in the thing brought, or the description of its condition. Particular mention will be hereafter made of the use of maize in its green state, as an article of food highly esteemed and wholesome, it suffices now to state the fact, and to refer the reader to a description of an ear just before it is ripe, wrapped up in its dried sheath, or "husk," as it is familiarly termed. This produce of the field fresh gathered, as intimated by the description of it, with the "husks thereof," and accompanied by the wheaten bread and barley loaves, would form a very acceptable offering from the hospitable neighbour from Baal-shalisha during the dearth; and it was, doubtlessly, roasted, as it is the present custom to cook the green cobb, in the embers of the fire which had seethed the pottage. On the minds of those



who have been accustomed to eat this delicacy, or see these ears in a green state, wrapped in their folds of paper-like husks, exposed for sale in the public market, the foregoing remarks will be impressed with the greater force.

Other texts occur which bear on this view, and further illustrate it; thus, in Leviticus ii, 14, an injunction is laid on the Israelites in these words:—"Thou shalt offer for the meat-offering of thy first-fruits, *green ears of corn dried by the fire*, even corn beaten out of full ears."

With the last observations in view, how striking is the fact of "green ears" being required as "a meat-offering of first fruits," how appropriate the young ears of maize which were used as food, or in other words "meat," and esteemed a delicacy; whilst, how apparently unsuited would be the unripe and unformed ears of wheat, or other such corn, whichever kind might be meant. The word "corn" might certainly be here taken to include all kinds of grain, as in some passages is most probably the case, had not its green ears been so pointedly specified, and provision (if not here yet elsewhere) made for the offering of the other sorts of corn, more appropriately presented in their ripened grains. With respect to the additional phrase, "even corn beaten (or pounded) out of the full ear," it is to be remarked, in anticipation of a possible objection, that the word "even" is in italics in our version, and denotes that

it does not occur in the original tongue, but was supplied by our translators to explain, as a probable suggestion, the context. It is suggested, but without pressing the conjecture, that it should be "and:" and further, that if the above facts respecting the eastern origin of maize, and this use of it as food, had been known to those learned divines of the time of James the First, they would have better understood the allusion, and made the offering of beaten corn an addition to, and not a forced exemplification of, the preceding phrase; it being also observable, that, to beat out the grain from *green* ears, seems an unintelligible solecism.

We need note but little more on this appropriate text. How natural, now, will the references in the immediately subsequent verse appear—"And thou shalt put oil upon it, and lay frankincense thereon, it is a meat-offering, and the priest shall burn the memorial of it," &c.; that is, a small portion of it, as a memorial of the offering. It suffices to state, that the present manner of eating the green maize in America, is to roast it before the fire, and then put butter and salt upon it, to complete it as a dish; in the east, where the olive yields its nourishing oil, it is well known that this is applied by the inhabitants in their cookery in the stead of butter; and that spices are there used as a condiment more than salt; hence, then, nothing, as a "*meat-offering of first fruits*," could be more suited to the country or the

people, both as an offering to God of thankfulness, and to provide a suitable portion for the maintenance of the ministering priests. How strange a one would have been a mess of parched green grains, say of wheat, needs not to be pointed out.

As this is an interesting view of the subject, we are unwilling to leave it, without a further consideration and comparison of the passages in Scripture, which may tend to enforce the previous criticism. The prohibitory texts supply us with similar arguments to the last, in reference to the common custom of eating the green ears of corn, a use to which those of wheat were never known to be put in ancient or modern times.

Thus, in Deut. xxiii, 24, 25, an injunction is laid upon those who might be induced, by the patriarchal license allowed the hungry, to help themselves too freely of the produce, on entering their neighbour's corn-fields. "When thou comest into thy neighbour's vineyard, then thou mayest eat grapes thy fill at thine own pleasure, but thou shalt not put any in thy vessel. When thou comest into the standing corn of thy neighbour, thou mayest pluck the ears with thy hand, but thou shalt not move the sickle into thy neighbour's corn." Again, in Levit. xxiii, 14, the Israelites were thus commanded—"Ye shall eat neither bread nor parched (that is, roasted) corn, *nor green ears*, until the self-same day that ye have brought an offering unto your God."

With respect to which texts, it may be observed, and with some emphasis, that, as commonly understood, they pre-suppose a most singular custom, of which we have no intimation as existing, either amongst the Jews, or other "corn-consuming" nations, in ancient or modern times. To imagine the wayfarers amongst the Israelites, in the one case, accustomed to pluck off and eat on the way through their neighbours' fields, either the ripe or green ears of wheat or barley, to satisfy their hunger, and in the other, to require a prohibition to restrain the proprietors themselves from a similar use of their own produce, until they had made a meat-offering of the first fruits, requires the conception of an extraordinary fact. And when it is considered that the Asiatic wheat, and particularly that of Heshbon, was a bearded kind, this supposition is the more unnatural; but let the green ears of maize be considered as the corn referred to, and the matter is an ancient version of a modern practice. It is to this day the custom in countries producing Indian Corn, for both the traveller and the farmer to pluck off the ears by hand, and bite the sweet milky grains of the unripe cobb, making often what is esteemed a very palatable meal of them; an instance of which, in our Saviour's time, will, no doubt, have occurred to the reader, when his disciples "*were an hungered,*" and began "to pluck the ears of corn and to eat."—To satisfy one's hunger upon bearded wheat, ripe or un-

ripe, is certainly not an impossible supposition, but it is *prima facie* improbable.\* As an illustration of the manner of gathering the Indian Corn, an allusion seems to be made in Isaiah xvii, 5, who thus refers to the harvest man, when he "*gathereth the ears and reapeth the ears* with his arm, and it shall be as he that *gathereth ears* in the valley of Rephaim,"—a reference as inapt to the mode of reaping either wheat or barley with the sickle or scythe, as peculiarly applicable to the harvesting of maize by the gathering of the ears by hand.

I shall conclude by a reference to two other passages, unconnected and of a different class to the preceding; one, the notable text from Gen. xli, 22, "And, behold, seven ears of corn came up in one stalk, (or, literally, in the Hebrew 'koneh,' a reed,) full and good."

The corn seen in this dream has been generally taken to be of a natural kind, such as was then grown in Egypt, and not an emblematical sort, unknown in nature; and as such has been usually

\* It may be objected that the phrase "rubbing them in their hands" occurring in the context given in St. Luke (vi, 1,) in this instance, tends to shew that the disciples plucked the ears of wheat and not of maize; but in reply, it may be observed, that the words in the original are strictly to be rendered as "*breaking* them in pieces in their hands," which the translators applying to the pre-conceived notion of wheat, adapted to the mode of extracting that grain from the ear; on the supposition, however, that maize was intended, this *breaking* it in pieces would not only be peculiarly appropriate, but solely applicable, and so strengthening instead of weakening this position.

illustrated by a peculiar species of wheat produced in that country, having a bunch of ears growing from one foot-stalk. Without enforcing the question, I would merely ask, whether the reed-like figure in the frontispiece (with the addition of two more ears,) is not a more simple and satisfactory exemplification of Pharaoh's vision?\*

The other instance is that in Job xxiv, 24, where the wicked, "though they are exalted for a little while," are declared to be "cut off as the reedy (?) tops of the corn." Can anything be more descriptive of the top or head of a maize plant than this? or more plainly allusive to the practice of cutting it off, to be bound up for fodder, *as is the custom at the present day?* and in that view presenting a fit emblem of the lot of the wicked, in contrast to the destiny of the righteous, represented by the ears, which are reserved for a more honourable use.—It must be noticed that our version gives another reading of the last words of this text, but one singular and unintelligible, by rendering them "*as the tops of the ears of corn.*" It would seem that the translators, if one may be allowed the conjecture, puzzled to understand a custom of cutting off the tops of wheat or barley, (which, in fact, would be to shear the ear itself,) and comparing those to the wicked, attempted to solve the difficulty by considering "shibboleth," meaning "reedy" in this text, (according to Aaron Pick,) to have stood for

\* See chap. 6, where a further reference to this subject is noted.

"shibboleem," (plural) "ears," and so, by an odd-sort of phrase, which entirely destroys the beauty and the force of the figure, and pre-supposes a strange and unheard-of custom of clipping off the topmost ends of the beard, have rendered the verse altogether unintelligible to English ears. In the 6th verse of this same chapter, the word "boleel," translated "corn," has a peculiar signification, meaning a mixture of grain or fodder,\* and thus of singular applicability to a plant, possessing in an eminent degree the properties both of grain and grass, of corn and hay.

To sum up the above review, which was suggested by Cobbett's observations on the same subject, (although his criticisms have not been pursued,) the following extract may be given:—

"It is curious to observe," he remarks, "how strictly the Americans have, in naming the different parts of this plant, adhered to the appellations of Holy Writ. The fruit they call *corn*, the fruit and the cobb they call the *ear*, the delicate leaves which envelope the ear they call the *husk*, the part of the plant which towers up above the ears they call the *top*, and the ear when the corn is in its milky state they call a *green ear*—they roast it too just as the Israelites did in the days of Moses."

It may be asked why has so much been said upon this subject, and what does it prove? It is answered, because it is a new and interesting consideration on

\* See The Bible Students' Concordance, "Corn, ears of."

the growth and use of a plant presented for home cultivation, which, hitherto considered as peculiarly a native of America, has been shewn to date a remoter origin from the fertile plains that bordered upon Paradise; and, by viewing it as a grain-bearing grass, whose virtues were known and valued by the patriarchs, and references to the culture and use of which may be traced in the sacred scriptures, (if the above expositions be correct,) we may be stimulated to naturalize a product possessed of such properties and hallowed by such associations. But it may generally be observed, that in proposing these criticisms, and suggesting that the word "corn," in many of the passages occurring in the Bible, refers either particularly to maize, or necessarily includes it; a *true understanding* of the word given is rather contended for, than another interpretation of the original interpolated. Should any one or more of the above texts be considered, or proved by more experienced philologists and linguists than the writer, not to refer to maize, but to wheat; yet, as each rests on independent criticisms, the other passages would remain with what force they might possess, to establish the opinion that the former grain was cultivated by the early inhabitants of Palestine, and is referred to in Holy Writ.

According to Dr. Bowring's report, it appears that the "Syrian Dourra" now forms but a small proportion of the grain cultivated by the Egyptians, com-



pared with the produce raised in ancient days from the Nilotic soil—a failure rather caused by the abjectness of the people than the poverty of the soil; yet there, as in Nubia and Barbary, it still constitutes, with millet and rice, an important article of human subsistence.

In Palestine also the maize is but a subsidiary object of cultivation; the restless and ill-governed possessors of that down-trodden country sow it without hope and reap it in fear; it languishes on its native plains, and partakes of the blight which has so long withered the land that once “flowed with milk and honey,” and yielded its “corn, and oil, and wine abundantly.”

This prolific corn was flourishing, if we rightly interpret the sacred record, at the time when the chosen people were the lords of that “pleasant land.” But though the ancient fields of Palestine are now neglected, and their scanty crops scarce suffice for the wants of its present inhabitants, the time may be anticipated when the land shall lie no longer fallow, but will yield again its double harvests to the expatriated tribes, when they shall return to their allegiance and their allotments. The vallies then shall once more stand “so thick with corn, that they shall laugh and sing,” and, above the other crops, this ancient plant be seen, whose “green ears with the husks thereof,” shall feed the people, as of old, and its “reedy tops” afford a fodder for their cattle.

## CHAPTER III.

THE SEVERAL KINDS OF MAIZE, AND THE PRACTICABILITY  
OF CULTIVATING SOME OF THE HARDIER SORTS  
IN ENGLAND CONSIDERED.

Although but two species of Indian Corn are at present known, "a great number of varieties (in the words of a modern author) are cultivated, differing in the size, hardness, number, and colour of the grains, the forms of the spikes or ears, and what is a very important circumstance to the human family, (and bears materially on the subject of this chapter) in the time required to bring them to maturity." These numerous differences in kind have all been produced from the species, described in the preceding pages, by the manifold modes of cultivation, and the changes of condition which it has undergone, during its long attendance on the footsteps of man.

A consideration of these varieties will be found to be intimately connected with the position proposed for discussion, and may therefore not only precede the statement of our arguments, but will fitly follow the investigations pursued in the former chapter. We will take them in their order, but first, it will be proper to complete our accounts of the

genus, by a notice of the other species, to which allusion has been made. This is the "Zea Caragua" or Valparaiso Corn, a native of Chili, and a favourite object of cultivation, in that province of the New World. It is a smaller plant, in every respect, than the common maize, and not so productive, and is distinguished chiefly by its possessing serrated leaves; but little, however, is known of it beyond this characteristic, although a peculiarity to which it is subject, on being cooked, has obtained for it a notoriety, which invites a passing notice.

The Chilian maize is held in religious, or rather superstitious reputation by its pseudo-christian cultivators, on account of the grains, when roasted, splitting into the form of a cross, after the manner of the baker's sign manual on the top of those "hot cross buns," so famous formerly amongst our Roman Catholic ancestors.—A prediction might be ventured, that such a characteristic as this would infallibly win for the plant an equal degree of childish veneration, were it introduced into this country, amongst a certain symbolizing section of the community, whose astute invention is able to extract every possible meaning from any given form.

The varieties of its better known congener, to an account of which we will now proceed, are extremely numerous—Between 30 and 40 different kinds out of about 150 that are supposed to be diffused over the globe, have been described by various writers,

but a list of all of them would be more suited to a Gardener's Calendar, than to this treatise; and a general view is all that will be necessary to take of them at present. They may for practical purposes, be divided into the Dwarf and Tall, or which is an equivalent division, into the Early and Late, as they are indeed usually described by growers; the taller being invariably the later, and the dwarf the earlier.—The former nomenclature has however been adopted as more clear and precise. These two kinds may be again distinguished under the Yellow, White, and Red in its various shades, besides a mixed multitude, comprising more than all the tinctures of the rainbow, black, purple, blue, violet, orange, green, and variegated; and these either in entire colours throughout the ear, or in grains of different lines, mingled in disordered assortment, on the same spike. The first division, however, is the more important, as neither the colour of the grain, nor the form of the ear, (which is either long and cylindrical, or short and pyramidical\*) appears to mark any corresponding peculiarity in the constitution or capacity of the plant, or the quality of the corn; unless it be that the darker shades are as a rule the hardest; but with this exception the above characteristics are indiscriminately distributed amongst each of the two classes, here proposed as a primary division.—Mr. Cobbett observed that "this mixture of colours in a heap of corn adds to the

\* See Plate II post.

beauty, but that is all the advantage that I know of, for the flour of both is of the same colour and of the same quality; and it is curious enough that while there are always some red ears in a field of corn, if you plant the red grain, the fruit will not be red, except in the same proportion." It may be observed that the yellow sort which is the most usual, is in America called "golden corn," and the white variety is there termed "flint corn," from its singular hardness, the red and other different colours are found to diversify the appearance of the crops wherever grown, but it is believed to distinguish more especially the "Turkish Wheat" cultivated on the European continent, and shewn to be a native of Asia. This circumstance is probably attributable to the changes of soil, climate, and mode of cultivation to which it has been subjected, in its progress, with what may be termed Caucasian civilization, and which have been much greater and more diversified, than those that have affected the species of the western hemisphere.

The difference in the time required by these several varieties to complete the growth of their seed, is a notable and singular feature, in the constitution of the Indian Corn; this property is shared in some degree by other species of the gramineæ, and peculiarly proves them to possess extraordinary powers of adaptation, to diversities of temperature and climate. —Some sorts of corn need a period of five months from the time of shooting forth their beautiful bright green sheathes, clear of the dull brown earth, to reach

maturity, others require only six weeks, whilst some demand a warmer but shorter sun to ripen their grains than the rest, others require more or less shelter, endure greater cold, or want drier ground or a richer soil.

This general statement in regard to the various kinds of a grain which is cultivated in America, from the province of Chili in the South, to New Brunswick in the North ; and in the Old World from the South-Western coast of Africa, to the German states of Europe, and throughout a great portion of continental Asia, will serve the purpose of the present chapter. A more detailed examination and extended consideration of the character and respective qualities of some of the most esteemed varieties, is reserved for the occasion of discussing the question of seed to be recommended for culture in this country. It suffices here, on that head, to state, that the early dwarf kinds, such as are raised in France and Germany, or in our North-American possessions, but more especially the former, for reasons which need not now to be enforced, are those which should in the first instance be the objects of our care.

From the two prominent peculiarities just considered, the great diversity as well as numerous varieties of maize, and the different periods required for their growth, it might without further reason be inferred, as it has already been, in passing, suggested in regard to the later characteristic, that the plant possesses

considerable powers of adaptation, and submission to the many and varying conditions (be they of soil or climate) to which it has so long been and still is exposed, in the service of its human master. To the faculty especially of accommodating itself to the seasons, and ripening its seeds in shorter or longer summers, according to the peculiarities of the climate to which it has been subjected, is manifestly to be ascribed the following character assigned to it by an author, who has nevertheless subsequently countenanced a notion somewhat at variance with such an ascription. "It can be cultivated in a far wider range of climate than any other species of grain, not only throughout the tropical regions of the globe, but in the most northern parts of the United States" as indeed appears by the preceding references. An assertion which if founded (as we contend it is) on fact, evidently goes far to establish the position which it is the purport of these pages to maintain ; that some of the many sorts of Indian Corn, already naturalized in Europe, from a remote period, may be also successfully acclimatised in the southern counties at least of England and Ireland, so as to yield a wholesome and nutritious grain as food for man, and produce in any portion of the United Kingdom, in its leaves and stalks, a rich and valuable fodder for our cattle.

The commonly received opinion, as to the incapability of Indian Corn to arrive at maturity in more northern situations in Europe, than those in

which it has hitherto flourished, may be given in the words of the statement referred to as inconsistent with the previous quotation. "It *seems* that there is a particular line in the continent of Europe, north of which the maize does not thrive, to the south of this line which passes through Nancy, formerly the capital of Lorraine, in France, it has in a great measure superseded wheat and rye, as the common produce of the land."

The statement here made requires evidence, the authority or grounds for the assertion ought surely to have been appended, for the consideration of the reader, if the writer were not disposed to add a comment. Nothing however but the bare position is given and it is to be remarked that this is put with a doubtful "it seems."—The only certainty indeed appears, that the corn in question is in practice *not grown* in the prescribed regions, but whether it would not thrive if sown, is not so evident, and whether the experiment has been fairly tried we are not informed. This omission is the more remarkable, because the value and importance of the produce, thus quietly left to the fortunate natives of the south, are fully appreciated by the writer, who immediately proceeds to give a tempting summary of its many excellent qualities, and of the profitable uses to which it may be applied; for some of which, it may be observed, it is manifest that the plant might be used in England, even if our "skyey influ-



ences" would not ripen its ears. Thus, in its young and milky state, it might be brought to table as a green vegetable, and as a fodder be supplied for the manger.

But are there in truth any, and what, preventive causes, which must *needs* debar us from the benefit and advantages of a grain which every other shade of the human family value so highly, and on which they fatten so complacently? We may venture to assert, that there is none, either in the nature of our soil, or in the nature of the plant; what difficulty occurs, is rather in the nature of our notions, a second nature, which a habit of thought and preconceived ideas have engendered in our minds. A too strict adherence to the letter of that favourite Anglo-agricultural motto, of "Live and let live," has induced a *too* contented, because inactive, willingness to leave all the world in the enjoyment of maize, green or ripe, so that we can only grow or get wheat, and carelessness in regard to a species of food which, throughout the world, is esteemed the most essential. That any man under the sun should be deprived of this great source of human subsistence, extremely puzzled the simple-hearted Mrs. Wiggins, of Long Island, who, on being informed by Cobbett, "that the Britishers had no corn," to wit, maize, exclaimed with the most profound astonishment—"then *how* do the people live?" Nor would the fact that we had plenty of wheat, barley, rye, oats, pease, and

beans, satisfy her. "But, then, how could they have pork, or poultry, or, in short, how could they live and have anything like a sufficiency of food?" was her pertinacious rejoinder. Mrs. Wiggins might not be a philosopher, or remarkable for her attainments, but her common sense enabled her to estimate the value of a product by its manifest and notorious qualities; and her experience led her, although illogically, to conclude that what supplied all her own wants, and those of her neighbours, must needs be a universal "*sine qua non*." Without entirely supporting Mrs. Wiggins in her enthusiastic views of the dependence of human life upon the growth of Indian Corn, it may, nevertheless, be profitable to consider whether a gift so suited to the wants of man, is not within our own reach; if we do not err in the opposite extreme, by a heedless disregard, not only of the opportunity to enjoy it, but our capability to cultivate it. Surely it is a consideration of great moment, and at this time of especial interest and importance, to enquire into the practicability of producing, on our own farms, a crop which, in the United States of America, and the European Continent, forms the staple food of the people, whose domestic animals speedily fatten upon its grains; and who themselves, by living on bread made from the flour, become strong and hardy races of men. It is a plant, the compendium, indeed, of vegetable products, the produce of which, as we shall see in the sequel, on a

given extent of cultivation, is greater than that of any other grain, and the proportional return of which, for a given quantity of seed, is equally advantageous.

The question, then, is simply this: Can the corn be grown in England? or is our own country so far north, and its climate so ungenial, that a plant of such infinite diversity in species and difference in qualities, growing within a range of latitude shared by few other vegetable products, and subjected to so many vicissitudes and conditions, would refuse to flourish in our fields or ripen in our summers? To answer, Quaker-like, the question, another may be asked, a reply to which may assist to solve, if it do not categorically answer the first. What would have been our present condition had our sturdy ancestors (who, by the way, never long left themselves the leisure of peace,) supinely concluded that their changeable and chilly climate, their land of dreary wastes and wild woods, could not have been by cultivation made to produce the fruits and flowers, the very wheat, in truth, of which we now boast, and which we reckon the staff of our lives? The grafts and seeds of these were all brought by their adventurous travellers, from foreign lands, transported either directly from their native climates, or, after a course of apprenticeship, (if the term may be allowed,) to the temperature of European latitudes. Through such probation, be it remarked, the maize

has already long passed, ready, it is ventured to be asserted, for the service of other masters, and to feed the hungry of other lands. Let the reflection, that but for such ventures and experiments as these, on the part of our forefathers, our now fruitful fields had yielded us but sorry bread-making grain, our gardens grown but stunted weed-like flowers, our orchards but sour crabs, and bitter sloes, and that our pigs, not to say our peasants, would have to grumble over acorns; excite us to extend the advantages we have thus derived, by bestowing like benefits on our posterity.

A more particular consideration of these important and interesting facts, will better enable us to perceive the force of the argument contained in this question-asking answer—and first in regard to *wheat*, to which, indeed, the Indian Corn bears a remarkable resemblance, in respect to its remote origin, its extensive and wide cultivation, and the mystery attached both to the land of its nativity, and the period when first subjected to tillage; and next also to which it ranks in furnishing the most essential elements of vegetable food.

This important grain, so precious to the human family, peculiarly adapted to its wants, and referred in the oldest mythology to the especial bounty of a deity, is a notable example of the principle here sought to be applied to the growth of maize. No greater instance of the plastic power of agriculture

in modifying and transforming the produce of the soil, so as to render the ready earth fruitful of esculent products, and abate the rigours of a naturally ungenial climate, can be given, than that afforded by the culture of wheat. This is a providential adaptation of the highest importance to mankind, when it is considered that the various races in every part of the globe derive their entire sustenance, in some shape or other, from the vegetable kingdom, either directly as herbage, or when previously converted into animal tissue.

No researches have yet been successful in distinctly tracing the origin of wheat, or the other cereal grains, which now form the staple of the agriculturist; they are all, however, generally assumed to be indigenous in that region of Asia known by the appellation of "the East;" and derived, whenever sown by the hands of man, from the localities which have been pointed out as the source of their more prolific and not less valuable congener. Wheat, indeed, has been discovered growing spontaneously, if not wild, in some uncultivated spots in Persia, at least such would appear to be the case, although it can scarcely be proved that human settlements had never been formed, and so human labour never been bestowed on those places, in remote ages of the world. But where do these corn-bearing plants flourish now? It were easier to answer, where do they not now wave their golden heads? They

are found in every quarter of the globe under cultivation, from the torrid to the very confines of the frigid zones—sprung at first from a rich soil, and in a genial clime, these bread-giving grasses have, by means of a man's industry, and the accommodating laws impressed on the elements, which in their turn rule in the earth and air, been made to produce, mature, and ripen their seeds, under heat and cold, drought and moisture. Morasses have been drained, and forests levelled, before their steady peaceful march, and the mutual modifications by which climate adapts itself to a new vegetation, and foreign plants originally unsuited, become in process of time acclimatized, has acted and re-acted, so long and perseveringly, that grasses, which once grew only on the banks of the Euphrates, now yield their harvests in the heats of Africa, and the frosty seasons of northern Europe. And when it is considered that wheat, for instance, has been taught not only to ripen under our sun, but to brave the rigour of our winters in its green blade (which, by the way, is not required of maize) the example is the more encouraging,

A slight sketch of the gradual alteration, which the general climate of our quarter of the globe has undergone within even a comparatively late historic period, will illustrate these remarks, and prove generally, how much the temperature of the earth and

its seasons, are changed and modified by causes, which result from the cultivation of the soil—that blessing which was born of a curse. Hume in his “Essay on the populousness of Ancient Nations,” has investigated this subject with acuteness, and though we may be at variance with his deductions, and the purpose of their statement, some of his facts may nevertheless be appropriated with advantage, to expound the question before us. “Italy, for example, has at present so warm a climate, that winter frosts are almost unknown. It was not so formerly—Horace speaks familiarly of the streets and neighbourhood of Rome being frequently covered with snow and ice. In the year of the city 480, the winter was so severe that the Tiber was frozen firmly over; the trees were destroyed by the intensity of the cold, and the ground was covered with snow for forty days. In other parts of Europe a similar difference is indicated. Gaul was anciently represented as a most inhospitable climate. Diodorus Siculus speaks of its extremely severe northern climate, where, in cloudy weather, snow falls instead of rain; and, in clear weather, the rivers are frozen so hard that large armies might pass with all their baggage and loaded waggons. Strabo states that the northern parts of Spain are thinly inhabited on account of the great cold. Varro speaks of the inland countries of Europe as invested with almost

perpetual winter, and Ovid mentions the Euxine as in his day frozen over every year." On comparing these accounts with the state of the European climate in modern times, the late Reverend Henry Duncan remarks—"We cannot fail to observe a most striking and general amelioration, and we need not hesitate in attributing the change to the effects of agricultural improvement. The climate of North America is, from the same cause, becoming gradually less severe, and assimilating itself to that of Europe. Wherever the ground is extensively cleared of wood, and cultivated, the mildness and salubrity of the weather is materially increased."

In the days to which these chilly references have been made, Sicily and Egypt were the granaries of Europe; the climates of France, Germany, and Britain were more ungenial than the bluff, untempered seasons of the Canadas, with their huge forests yet unknown, and immense tracts unbroken by tillage. Wheat had not then been subjected to the vicissitudes of northern latitudes, and the soil, which now bears it so abundantly, had not been brought under the dominion of the plough. Nor, at that period, had maize advanced far on its western travels; it is not certainly known whether it had, in those early days, even reached the vallies of Greece or the plains of Thrace. But its kindred genera had, it would seem, preceded it, and obtained a firm footing in the countries bordering on the north of the Mediterranean;



and although the whole cereal brotherhood cover the continental fields, the straw-stemmed species keep the lead; but why do those with their reed-like stalks still linger? Are they so differently constituted as to render their following the course of cultivation impracticable? or is it that the cultivator, contented with his success in the tillage of one class, has been careless to produce the other? Analogy would lead us to conclude, that the latter could as safely pass the English Channel as the former; and it must be confessed that our countrymen have scarcely attempted its acclimatization, except in a manner, and on a scale, which, whilst it sufficiently confirms by experiment, what we shall attempt to elicit in argument, makes it the more remarkable that our farmers have not been awakened to the subject. This supineness! in a country where the art of agriculture is pre-eminent, and the soil of which bears, and its summers ripen, fruits, equally with this, the natives of eastern lands, yet more delicate and tender—for example, the peach and the fig.

If the reasoning here suggested were followed to its full extent, and the history and adventures, so to speak, of the principal products of our fields and gardens, could be chronicled, traced from their native climates to our own; and were the mutual adaptations of temperature and soil, to the properties and capabilities of the various plants of exotic origin (now claimed as denizens), carefully investigated, the

analogy just drawn would be greatly strengthened, and more apparent. Indeed, many of our plants and fruit-trees naturalized since the Roman invasion, will be found on a comparison of the influences of their native, with those of their adopted land, to have undergone as much, if not a greater change, in the condition of their growth, than maize would be required to endure, if introduced next Spring upon our farms. *These* have proved their power of enduring cold, and the capability of adapting their energies to varying climates, it remains for *this* to exhibit similar abilities, and acquire an equal notoriety. A few examples may be vouched in support of these assertions, and to justify such an anticipation.

To begin with the cherry, a fruit-tree now so common, and even hardy, first introduced into Europe in the year 73 before our era, by Lucullus, from Pontus, as a memorial of his conquest of that province of Asia Minor, where it still pre-eminently flourishes, and attains a remarkable magnitude.—Within a century after this event, it became acclimatized in France and Germany, and was eventually transplanted, by the masters alike of the arts and arms, into Southern Britain; where this favourite fruit soon shared with the plums (which had been previously brought to the island,) the honour of supplanting the native sloe, and stocking the gardens of the Roman colonists.

Next, that princess of stone-fruits, the luscious,

melting, mellow peach ; this had a yet more sunny clime for its home, and though it now bears so freely and ripens so fully, throughout the greater part of England, was a native of Persia—it is, indeed, with the nectarine, and its other varieties, but a pulpos almond, “got up,” like an ortolan amongst birds, deliciously fat. To the same warlike gardeners are we also indebted for this gift. On their introduction of it into Italy, they gave it the name of *Persica*, a name it still retains under various modifications in the different countries of Europe ; thus our own designation is evidently derived from *pêche* or *pecher*, formerly written *persier*. It now grows well in our sheltered gardens, and though not hardy, it withstands the generality of our winters. It even succeeds in America, where it is, of course, comparatively a late introduction, through winters more intense, but summers hotter than in England.

An Asiatic origin may likewise be assigned to our pears, which appear, in constitution and range of climate, to resemble the cherries ; flourishing in the olden districts of Asia, and those countries of Europe which earliest emerged from wildness to civilization ; but, like them, they cannot yet bear the severity, for instance, of a Riga climate.

There are two other fruits, the mulberry and the fig, which, if now somewhat out of fashion and neglected, and, like the vine, have shared the fate of the suppressed monasteries, (although not formally

included in the statutes,) are yet each capable of a higher and more general culture, in the open air, and upon our garden walls; and would reward us with a rich and wholesome addition to our dessert. They are both natives (it might almost be said of course,) of Asia, the nursery-garden of the world: Persia is assigned as the habitation of the former, the introduction of which into this country dates about the middle of the 16th century.

These fruit-trees, with the walnut and chestnut (two other foreign importations, the one by the Romans from Persia,) formed the staple of the olden abbot's garden, and afforded the monk one means, at least, of benefiting mankind. Within the inclosures of our ruined abbeys there are often found the remains of aged fruit-trees: "The venerable pears, the delicate little apples, and the luscious black cherries. The chestnuts and walnuts may have yielded to the axe, and the fig tree and vines died away, but sometimes the mulberry is left, and the strawberry and raspberry struggle among the ruins."

And, lastly, the vine may be cited as an evidence, at once, of the power of vegetable adaptability, and the changes which climates undergo during the progress of cultivation. The grape-bearing vine is one of the most useful and extensively cultivated plants, flourishing at various elevations, from 55° North, to 40° South of the Equator. In the early ages of the world, it was confined to its warmer plains and sunny

slopes, where the long summers lingered ; but it now extends its twisting arms and twirling tendrils over the site of bleak moors and dark forests, whose chilly mists, in the days of Rome, checked vegetation and shut out the sun, by clouds and shade. It has spread with the march of civilization, which alike ameliorates the manners of mankind, and moderates the temperature of the earth. The following sketch is so aptly to our purpose, that it may be transcribed as it stands :—

“It is among the plants of which we have the earliest records in the Books of Moses, and from which, it appears to have been made use of in the same manner as at the present day. Although the vine is found in many places wild, it may still be doubted whether it is indigenous there, on account of its frequent cultivation. There can be little doubt of its being truly indigenous in the East, in the district between the Black and Caspian Seas. In the forests of Mingrelia and Imeritia, it flourishes in all its magnificence, climbing to the tops of the highest trees, and bearing branches of fruit of delicious flavour. In these districts no cultivation of the vine exists, and the inhabitants seldom harvest the abundance of fruit that is produced. It is not probable that these vines are the remains of former vineyards, as plants mostly degenerate when they become wild after cultivation ; which is not at all the case with these grape-vines. It is probable that

the wild vines found along the borders of the Caspian Sea, throughout Persia, in the north of China, and in the Deccan, and Cashmere, are all indigenous, although the plant is cultivated in these districts.— In many spots in France, Germany, Portugal, and Italy, the vine is found wild, but the fruit is very generally of an inferior kind, and it may be doubted whether it is truly indigenous in any parts of Europe.

“We have no accounts of the introduction of the vine into Greece; it was evidently cultivated there before the time of Homer, and is supposed to have been later introduced into Italy; and the Romans probably spread it through the north of Europe, and introduced it into Great Britain. Bede, writing in 781, says there are vineyards growing in several places. These vineyards in Great Britain were generally connected with monasteries, as the inhabitants of those places paid great attention to the cultivation of fruit. When monastic institutions were abolished, vineyards very generally disappeared in this country, probably both on account of there being no monks to attend to them, and better wine being obtained from the fruit of other countries. Much has been written about the re-introduction of vineyards into Great Britain. There can be no doubt that grapes could be produced in abundance, and acquire a certain degree of ripeness in this country; but our clouded skies and high latitudes

must prevent the production of fruit in this country *equal* to that of the lower latitudes, and under the brighter skies of the continent of Europe.”\*

In reference to the concluding sentence, it is much to be regretted that the culture of this pleasant and wholesome fruit in this country, has been suffered to decay; experience has proved that even in days when our seasons were less congenial, success attended its growth. It is true that our climate, and perhaps our soil, from the want of volcanic detritus, does not permit of the grape attaining such perfection as to yield a juice sufficiently rich for wines; but in the southern counties, and the eastern also, in the experience of the writer, excellent fruit may be obtained for dessert, in ordinary summers, and in warm, dry seasons, a very delicious crop can be produced, (particularly of the white sweet-water, and the black cluster,) by those who can manage a vineyard. Mr. Hoare, indeed, recommends as many as thirteen different sorts for out-door culture, embracing almost every variety, in flavour, colour, and size; and which he has found to ripen perfectly in the open air, under an English sun.

Here, then, is a fruit, which, more than any other of the examples cited, affords a most pointed parallel in our argument; sprung from the same sunny soil, the patrician vine has spread by the same route, and halted on its journey at the same stations, which its far more solidly worthy fellow-traveller, the plebeian

\*Penny Cyclopædia—Art. Vitis.

maize, subsequently traversed. Taking root in Greece, and extending its classic boughs across the Adriatic, it early yielded its luscious berries from the Ægean islands to Lusitania. These were its peaceful conquests; the next were in the footsteps of warriors. The Roman, as he pushed his colonies northward, could not relish the barley-wine or the metheglin of the Goth. The old "Falernian" was too precious a juice to be foregone, the chaplet of vine-leaves at the feast was prized by him equally with the crown of laurel on the field. The grape, therefore, marched with his armies, and whether on the terraces of Gaul, on the banks of the Rhine, or in the vallies of Britain, these martial gardeners planted the vine, wherever they placed their standard. Would that they had not forgotten to provide as carefully for bread, by planting at its side the "Zea maza;" would that they had given us a plant, which, forestalling the Potato, had become, before the discovery of that tuber, the staple food of the people!

The vine has outrun the maize, and been cherished by its patrons, it would appear, rather because of its more showy and sparkling qualities, than from any essential difference in its capability of climatic adaptation; the latter has, indeed, been left, like many a member of the human family, to win its way to public favour, on some pressing emergency,



through the sheer excellence of its character, or utility of its virtues.

Of the two productions, it would seem that the vine requires the greater care and culture, and unless matured is worthless ; whereas its less favoured rival would afford food for man and cattle, in a green and succulent state, if the season were adverse to its ripening. The analogy might be further enforced by a consideration of our brightest flowers, particularly of their queen, the rose, in her thousand forms, and our case would be considerably strengthened, could they relate their wanderings in exile, their trials and struggles under difficulties, of soil and clime, and final reconciliation to their lot ; blooming and breathing perfumes in their adopted as in their native countries.

But the sketch we have given will suffice for the controversy, and the force of its facts will, it is apprehended, be admitted as sufficient to establish a strong presumption, if it be not considered a proof, in favour of the position maintained. It is at least hoped that they are such, as will dispose our agriculturists to view the question as one fairly inviting attention, and to induce them to attempt, on a suitable scale and with adequate care, the culture of a grain prized wherever grown, and grown within a short distance of our shores. The boon is within their reach, their potato-fields are waste, and the

poor are starving around them. Let the example of those, into whose labours of acclimatizing the present produce of our farms and orchards, we have entered, stimulate us to follow in the patriotic work; let us not rest contented with transmitting the benefits received, without swelling the store by accumulations, which would return more than 'seven-fold' into our own garner.

It may possibly be objected, that the examples of fruit-trees are not in analogy with an annual plant; in every respect they may not be, but in regard to the question in debate they are, it is apprehended, so far in point, as to form an "a fortiori" argument; for if the vegetable productions of eastern and southern climates, can be made to adapt themselves to a northern temperature, so as to stand lingering, and often severe winters, it may with greater reason be concluded, that those which require only the more genial seasons of the year, in which to spring, mature, and ripen, may be the more readily acclimated.—Instances of other naturalized exotic annuals might have been adduced, in further support of the case, such as our peas and beans, tomatos, and several species of gourds and cucumbers, but it was thought sufficient to select and enforce the precedent of wheat, a kindred product, as one more apt and alone convincing. Those plants which yield their root and not their seed for food, are inapplicable to our purpose, for a manifest reason: the ground might well

afford sufficient warmth to produce that portion of the plant fit for the table, and yet be unable to perfect its fruit.

Thus much for analogy and reasoning ; it will be seen in the sequel, how far the conclusion at which we have arrived, that Indian Corn, as a genus, could be successfully cultivated on as wide, if not "a wider range of climate than any other species of grain," is supported or confirmed by the facts of experience, derived from the growth of several sorts, at different times, and in various parts of England.

## CHAPTER IV.

THE CONSIDERATION OF THE PRACTICABILITY OF  
CULTIVATING INDIAN CORN IN ENGLAND, CON-  
TINUED, AND SHEWN TO ACCORD WITH EXPERI-  
ENCE.

If the reader have followed, with the mind of the writer, the remarks and inferences submitted to his judgment in the preceding chapter, he will probably anticipate, and be prepared to investigate, the statements and references contained in the present.

It will not be deemed perhaps too confident to assume, that a *prima facie* case has been established, with a claim sufficient to gain favourable attention for the important subject pressed on public notice ; but if "good cause" in reason have been thus far satisfactorily shewn, and a necessity for urging the discussion, such an attention is the more confidently anticipated, when experience shall be called to demonstrate.—The interest is that which a question of food or famine inspires.

Before we proceed, however, to the promised facts, one more argument remains to be examined. The wide extension over the globe of a plant, so singularly productive and nutritious, as the species of grass, which yields us wheat, has been noticed by

writers as a plain indication of a beneficent purpose in the Creator, bearing an impress of his providential goodness not to be mistaken. It being forcibly urged, that proof of a divine arrangement is manifest in the endowment of a product of such essential importance to mankind, with the highest capabilities for cultivation, and the most marked adaptation to the greatest diversity of climate. From this great natural law, by which the extent of the propagation of a vegetable is made proportional to its value as food, and its diffusion adjusted to its power of production, it follows, that the establishment of one, will, to a certain extent, predicate the other of these interchanging properties. The incontrovertible facts therefore, which prove that maize is endowed with even more extraordinary fertility, and possesses peculiar nutritious qualities, whilst they account for its numerous varieties, and the important position it holds as an essential article of sustenance to man, lead us confidently to conclude, that it is also endowed with the capacity of following his footsteps and enduring with him the vicissitudes of climates. Such capacity is of course exercised within certain wise limits adjusted to our wants, that is, wherever bread is required as the chief article of daily food, to develop the frame and sustain the vigour of our race, in obedience to the same law which regulates the diffusion of wheat. Indian Corn indeed partakes, in a great degree, of the pro-

perties and capabilities of that grain, and may be considered as bound on the same great mission; supplying the human family with food wherever the heat of the tropics does not render its farina a too exciting diet, or the frost of the regions around the polar circles, does not necessitate a still more stimulating aliment. Forming, with wheat and rice, the great vegetable triad which feeds the world, it is usually classed as the third grain in point of utility; but surely it might claim an equal rank with these cereal lords, for whilst rice can be cultivated in the warmer, and wheat in the temperate, latitudes only, maize is found to flourish within the range of both.

Thus far then for deductions—now for facts. Having considered where maize *should* grow, we will now shew where it *has* grown. That “facts are stubborn things” is a trite axiom, and yet if one mistake not, a great favourite with our worthy, solid, Saxon-sprung yeomen and farmers, whose especial attention we would win. The pointedness and stiffness of a fact penetrate our minds, it is visible, tangible, what has been or what is, is a warrant for what can be, or probably may be.—To such part of our position then we have arrived, and the question for solving is this.—Has Indian Corn ever been grown as a crop in England? not cultivated merely in favourable situations and with a gardener’s care, but has it been sown and ripened in our open fields, exposed to the ordinary vicissitudes of English

weather? and this not in one particular locality or under special circumstances, but in a manner and with conditions that may make the instances fair examples and practical precedents? These enquiries are thus broadly put in the outset, in order that neither the merits of the case, nor the purpose of the writer, should be misapprehended.

The objects of our search having been thus precisely stated, we proceed at once to the test of proofs. The writer's own experience is only that of an amateur gardener; his evidence therefore, if for no other reason, must give precedence to a veteran agriculturist's; and there is no one better entitled to the privilege of being first called before the committee of the whole nation (to fashion a parliamentary figure) for examination, than the late William Cobbett, to whose labours and writings in this matter reference was made in the introductory chapter. The grains of his statements on this subject may be thus winnowed from the husks and dust of his published accounts.

Two small ears of maize were brought to England in 1826 from the North of France by Cobbett's son, who obtained them from a gentleman living in Artois.—This province is now comprehended in the department of Pas de Calais, situated within the 50 and 51 degrees of North latitude, and so north be it observed of that very imaginary line, within which this same plant is in books arbitrarily detained a

prisoner on parole.—The corn producing this seed had been cultivated by the donor for a long series of years, but he could not give particulars of either its nativity or parentage.

On the 9th of June in the following year, the Cobbetts sowed about three quarters of a rod of ground with the seed of this French Maize at Kensington. The plants were up in five days, and were carefully hoed and managed, in the manner which will be explained in its place, and the result was, that the crop harvested, was seven gallons (Winchester measure) of shelled corn: that is, the grains rubbed off from the cob and fit for the mill. On this achievement, the elder experimentalist enters into the following calculation:—

“Now multiply 213, which is the number of three-quarters of a rod in an acre, by 7, the number of gallons grown upon this three quarters of a rod, and you will find the result will be 1491 gallons, which divided by 8 (the number of gallons in a bushel), the result will be 186 bushels and 3 gallons to an acre of land, statute measure.”

Here is exhibited an extraordinary increase, and though we may not be able to refer to it as a guide, in estimating the produce of even the same variety of corn grown on a larger and more general scale, yet it displays a capability of production, under given circumstances, to which no other grain approaches.

With the seed thus obtained, Cobbett planted a



field at Barn Elm, in Kent, belonging to a farm which he immediately took for the purpose of conducting his experiments on a scale sufficient to solve the problem he had taken in hand, and also, as he hoped, to introduce his corn as a main crop in British tillage; for he was impressed with a sanguine conviction, that he should be enabled, by proving its ability to grow, to cause its general cultivation throughout England, Ireland, and even Scotland. Here he continued to raise it with success, equal to that of his first attempt, and which induced him shortly afterwards to venture on a prophecy in an advertisement appended to his Treatise. The following passage is illustrative of his idiosyncrasy:—"I have had this year (it runs) a noble crop of this corn, and I undertake to pledge myself that this corn will be in general cultivation in England in two or three years from this time, in spite, &c." [We omit his vituperations.] "I promise myself the pleasure of seeing this beautiful crop growing in all their gardens—[referring to those of the labourers in the counties where he had introduced it]—and to see every man of them once more with a bit of meat on his table instead of the infamous potato."

That Cobbett did most undoubtedly succeed in growing the corn, year after year, on his own farm in Kent, and was instrumental in spreading its cultivation into many parts of this country, is indisputable; that he failed, however, to obtain for it general

notice, and to incite the nation to follow his example as he anticipated, and as, in truth, his efforts and the object deserved, is, unfortunately, equally undoubted. Perhaps the cause, though good, suffered from the mal-appropriateness of the time, or the manner of its champion's advocacy; his own doggedness and dogmatism may only have elicited and hardened the same inflexible traits in his countrymen. Like the old lady belonging to a Ranter's congregation, who resisted all its noisy efforts to get her up to the proper pitch of extempore distraction, and persisted that she "wudna' be converted," the incredulous portion of our farmers, may have withstood conviction, because it was somewhat officiously "thrust upon them." But whatever the cause, the fact was, that although our experimentalist calculated aright in what he undertook to *do*, he missed in reckoning the effect of such success on the minds of his neighbours: and hence again, although he was correct in the *spirit* of his prediction (as there is yet good hope to suppose), he erred, as many an unwary prophet has erred before him, by being too *particular* in his announcement, and limiting the period of its fulfilment. Had he stopt short of the "in two or three years," the prophecy would have stood to the present time awaiting its accomplishment. We venture to re-announce it, with this amendment.

The corn, thus proved to arrive at perfection in Kent, was a dwarf variety, about three feet in height,

with a compact cobb and bright yellow grains (similar to the one figured in the frontispiece), and described by its introducer as greatly differing in its growing qualities from the American kinds. Some of the earlier of these latter varieties, imported from New Brunswick for instance, he likewise succeeded in raising in Hampshire. He raised them year after year for ten years, as early as the nature of the plant would admit, and always (most properly) used seed of his own growing; the result was, as he states, "that the corn would ripen three times out of four, and come more and more early, and adapted itself more and more to the climate." But it was the former kind which he denominated "Cobbett's Corn" and chiefly cultivated, introducing it into Sussex, Wiltshire, Berkshire, and Middlesex, besides the two counties previously named, in several parts of which it was for some time grown with a degree of success amply sufficient to prove, beyond a reasonable doubt, that with proper care and tillage, with attention to seed and soil, it might take, and ought long since to have taken, its place amongst the accustomed courses of English agriculture. For evidence in support of these assertions, the reader is referred to the notices and reports spread over the horticultural magazines, journals of agriculture, and newspapers of the day; fuller information is there afforded to the enquirer, than could consistently with its scope be given in this treatise; a few examples, however,

contributed by contemporaries may be extracted, to enforce and illustrate the subject. The testimony of a contributor to the *Gardener's Magazine*, on the hardy varieties of maize, may first be appropriately introduced. A Lancashire nurseryman thus writes in 1832 :—"Fourteen years ago an eminent botanist called upon me ; he was then just returned from his travels in North America, and when upon the banks of the Missouri had heard of a variety of maize" (probably the "Sioux Corn" noticed in the next chapter) "cultivated near the Rocky Mountains, which he said he was sure, by an account he received of it, would ripen even in the Highlands of Scotland. Now (continues the correspondent) as there are often considerable sums of money spent to procure and naturalize to the English climate, foreign plants which neither are nor will be equal to the maize in point of value, I think it would be well worth the attention of some agricultural or horticultural society, or of some private individual, who could afford to bestow sufficient trouble and expense to obtain a variety which would ripen in every part of Britain wherever other grain would grow." Commending this fact, and these sensible remarks of a practical man to thoughtful consideration, we will resume the examination of our former authority on the results of his labours. He writes thus in 1828 :—"Here we have the indubitable fact of the ripening, and that too of the largest crop of corn

that I ever saw in my life. Some plants with suckers had as many as eleven ears each ; but one plant had seven full ears "rank and good" upon one stalk. My crop, if under ears and all were included, would be a hundred bushels ; the ears are the fullest and most perfect, the top of the cobb being crowned with grains. So prolific have some of the plants been, that we have found very many ears, each having a smaller ear growing out from the side. In several instances two small ears growing thus, in some instances three, in one instance, at Kensington, four, in one instance, at Barn Elm, five, and in another six." Surely here is amply sufficient evidence that this variety introduced from Northern France is not only capable of cultivation in this country, but *well adapted* for English tillage. If the above account be correct (and however enthusiastic or faulty in other respects, Cobbett may be deemed, he is at least trustworthy in all narrations of facts actually scanned by his own senses), the plant is in vigour and productiveness superior to the American kinds. That it was grown twenty years ago, and not yesterday, cannot affect the question, or if it do, the circumstance will be in our favour, for if so much was effected before the late rapid advance of agricultural science and practical improvements in the predial arts, what might not be accomplished by the operations of our present intelligent tillers of the soil, under the auspices of our great landowners as-

sociated in powerful societies? On reference to the map, it will be seen how even upon the line-of-latitude principle, this maize *ought* to flourish in our Southern counties. The greater portion of four, and parts of three counties, with the whole of Cornwall, lie within, or scarcely without, the latitude of the province, whence this seed was imported. The waters of the channel divide the districts which, if not identical, yet differ but little in temperature and the nature of their soils.

But to remove any objection which may arise from the consideration, that Cobbett was, as it is admitted he was, an enthusiast, (and it needs zeal to convert a nation) dogmatical, and so forth, it becomes desirable to examine a few independent testimonies, growers, or eye witnesses of the growth of this promising stranger in our fields. In the *Gardener's Magazine* for 1829, conducted by the late J. C. Loudon, a correspondent from the neighbourhood of London informs him—"That several varieties of Indian Corn, amounting in all to more than twenty, have been cultivated by Mr. Poynter of North End; among which (besides a still more dwarf variety from Egypt) that, so strongly recommended by Mr. Cobbett is to be found." The latter is however stated to be the same kind as that extensively cultivated in Nova Scotia and New Brunswick, of which, the writer of this communication had then by him good specimens, grown from seed imported from

Halifax in 1822. This supposition would seem to be erroneous, for Mr. Cobbett not only refers to this New Brunswick sort as a distinct variety, requiring more care in its naturalization; but as before noticed, distinctly states, that he procured the seed of the other from the North of France. If however they be two different varieties, then the fact of an extremely successful cultivation of those two, each from a separate quarter of the globe is satisfactorily established and helps the argument; if on the other hand they are really the same, differing only in peculiarities arising from a change of condition, then the equally important circumstance is elicited, that the North American species is capable of being acclimated to the parallel of 51 degrees of European latitude, and that, indifferently, on either side of the English channel.

Again, in the same Journal for 1830, a nurseryman of Bayswater, furnishes the following account of his growing this variety of maize, sowing it in the first week of May, and harvesting it in the last of October; his success elicited a commendation from Mr. Cobbett, who assured the grower that it was the finest he had seen. He states, "I have now gathered it; and from seven rows, each thirty-eight feet long, the produce is 1150 good ears, and 339 defective ones, which had it been a fine summer would all have been good." This, by his calculation is at the rate of about 100 bushels an acre. "Any

man (he continues) who can grow kidney beans can grow (Indian) Corn, and any ground that will grow the beans will grow the corn. My ground is much exposed and liable to early frosts." Another correspondent follows, who at the request of the conductor, makes a report on the culture of Indian Corn in the neighbourhood of London. He gives his evidence very cautiously, and considers that he could not arrive at any conclusive result, because but a few varieties, and those not the best, had been selected for trial. Of ten kinds grown at Waltham Green, it appears that all the tall ones (from America) ripened too late to serve as an article of field culture; whilst the dwarfs, in accordance with previous experience, being four in number, thrived well, and perfected their seeds.—One of these varieties he reports, is "an abundant bearer, as all early varieties must necessarily be, from the expansion of their blossoms at a season when the high temperature insures a dispersion of the pollen from the stamiferous flowers." "I must not (he proceeds) omit to mention that an extensive collection of Indian Corn has been cultivated by Mr. William Anderson at Chelsea, of seeds from Spain.—Out of a hundred and thirty varieties, about forty vegetated; twenty or thirty of which have perfected seeds sufficient for their increase." Here then we have established by further experiment, by trial and success, in more northern localities still, the interesting fact, that other



varieties, (one of which was American and another European) will flourish contentedly enough in our fields, and ripen their golden grains under our sun. As another instance is at hand, it may be given, but it is scarcely required, except to make assurance doubly sure.—The editor of the Hereford Journal of September 26th, 1832, says, “In a former journal we stated that the Messrs. Palmer, of Pencoyd and Ross, this year cultivated several acres, of what is generally termed “Cobbett’s Corn,” and that the crop promised to be very fine; this expectation has been fully realized, and we have received a cobb or ear from one of the fields of great size and perfection;” the mode of cultivation adopted by these gentlemen is then stated, and the paragraph thus concludes—“after this ploughing the corn grew prodigiously, and, as far as promise could, gave the lie direct to the wiseacres who said there would be no crop.” It will serve no purpose to multiply examples, or to reiterate instances, none can be more to the point than those quoted, and an accumulation of them would only encumber the book.—Yet a more specific reference to the authority, cited in the introductory chapter, is due, and a short statement of the result of the writer’s own experience may be permitted in conclusion. Mr. Loudon does not appear to have directed any very particular attention to the cultivation of this valuable corn-plant, at any rate few notices of it are to be found in his voluminous and elaborate

works; but such as occur are favourable to the views here advocated. Independently of his observations at the end, they may be summed up generally in the opinion, that it may be cultivated with advantage in this country, south of York, in appropriate situations; the straw he adds, "forms an excellent fodder, and the grain as a bread-corn is much liked by some, it abounds in mucilage;" although as regards his own taste, he admits a prejudice against it as food for the table. These are questions which we shall discuss in our next chapter.—He recommends the growth of the dwarf red-grained variety (in accordance it will be observed with the experiments previously considered) to be adopted when grown in England.

It is about twenty years since the zeal of the present advocate for the claims of his vegetable client was first excited, although he has not of late been able to continue his gardening recreations; yet on every occasion, except in the present year (to be accounted for anon) he has succeeded in raising fine healthy plants from five to six feet high, producing well developed tops and ears, and perfecting their seeds before the departure of our autumnal sun. Whence the seed was originally obtained is unknown, but it was certainly not a dwarf variety, as it proved by its growth; and although the trials were made in a situation on the Norfolk coast, more remarkable for easterly winds than for solar beams, and the plants were exposed five months to the vicissitudes

of our seasons; the grains were always well formed, sound, and fertile. Similar reports have been made by his friends, in regard to like experiments in other places.—Two cobbles grown in Staffordshire this summer are now before him, the one black and the other yellow, and another very fine ear from seed sown late in Shropshire, each the produce of tall and apparently American varieties. His own late failure, to which a reference has been made, resulted from his possessing a rival favourite from the animal kingdom, in the form of a young white-toothed, black-coated, Newfoundland dog, nomme "Triton;" a great herbalist in a canine way, and particularly partial to the fresh shoots of the class to which our vegetable protégé botanically belongs. This grass-loving Cerberus had his quarters near the plat of ground assigned to the Indian Corn in question, and was accustomed to watch his master's gardening operations with the most sagacious attention, pricking his ears, and lolling out his tongue (the rogue's mouth watering the while) with a then apparent indifference, but now too evident malice prepense.

The plants, from seed sown in May, had reached the height of a foot or more from the ground, and were stout and healthy; their bright leaves and swelling sheaths were spreading and unfolding beautifully. Thus were they seen on the evening of a day early in June; the next morning, the site which they had adorned was a blank, a desert, a level, as if it had

been used over night, by a couchant elephant; no rice plantation, after the nocturnal visit of a hippopotamus, could be more bare of any thing green. The desolation was so complete, that no adequate cause could be conceived; but the salutation of a cold, snuffling, earth-sprinkled nose, thrust into the hand of the bereaved proprietor of pet plants, soon disclosed the poacher. The dog-of-a-destructionist stood confessed, the demureness of his look revealed the deed. It was now apparent, that having by some means slipped his collar, he had taken an early medicinal breakfast, and eaten every plant of maize to the roots; the sugary juices of which were no doubt most refreshing and gustable.—He then completed his work by mangling out the bed with a post-jentacular roll, after the manner prescribed by the late Dr. Abernethy, for the relief of aldermen, done-up by dinner.

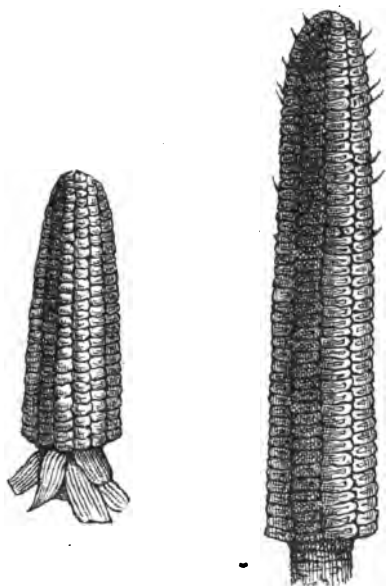
Recording then this special incident, it is now confidently submitted, that the pledge given to prove by facts, what had been shewn to be probable by analogy, has been redeemed, that the generally received supposition, that maize will not abide our climate, is refuted by the achievements of market gardeners and farmers within the last twenty years, and consequently the contrary position, that there are some of the 150 varieties of this interesting plant, which might be made to yield their valuable produce in English fields, to nourish English labourers, and fatten English herds, is satisfactorily

established.—Of what has been effected in following up these experiments, during the last few years, there are not such ample available records at hand, nor does the writer feel himself at liberty to use the names, or refer to the instances which have come under his own notice, so freely as those already made public property through the press, nor are they required. Corn has in fact been grown ever since, in different parts of the kingdom. In Essex, Kent, Middlesex, in the Southern and some of the Midland counties, stately rows of it may every year be met with in gentlemen's gardens, and patches seen on the grounds of intelligent nurserymen. But it may be enquired, were these attempts to raise such abundant crops always so successful? have there never been failures? Undoubtedly there have, nor would it be within the bounds of reason to expect the contrary. The most common crops fail in some seasons, and scarcely a year passes but a deficiency in some portion of the produce, upon every farm throughout the kingdom, is experienced; this is so notorious, and causes so many agrarian grumbles, in spring, summer, and autumn, that it needs only to be recalled to suggest the evident inference. And it may be also frankly admitted, that a correspondent of "the Gardener's Magazine," of a later date than those before quoted, who grew "Cobbett's Corn" for many successive years, but with not such results as the experiments of others had led him to anticipate, reports his partial disappointments. It must

be observed, however, that his farm was in a county, the meteorological influences of which are somewhat too trying for a stranger in the early stages of acclimatization. Lancashire, where the farm in question was situated, is more famed for its coal fields than corn fields, for rainy weeks than sunny days. Yet even here, the Indian Corn succeeded sufficiently to prove a valuable addition to the routine of the grower's crops, and a most useful product, as he admits, in his farm yard for fattening his poultry and pigs. It may likewise be allowed, that other failures occurred, and would in common course and very nature of things, occur again; resulting in part from causes, over which the farmer has no control, but more frequently from such as are within his power, by forethought and care, to prevent. The seasons and weather which, even in the countries where the maize has already become naturalized, materially affect its crops, exemplifies the one; inattention to the kind of seed, soil and other conditions, which should reasonably be considered on the introduction of a Foreign plant, will illustrate the other.

The results produced from these causes, considered as conclusions, when they ought rather to have been used as cautions, have contributed to increase the national antipathy of Englishmen to foreigners, vegetable or human, and have occasioned doubtless many favourable opportunities to be lost, and prevented many experiments from being fairly tried.

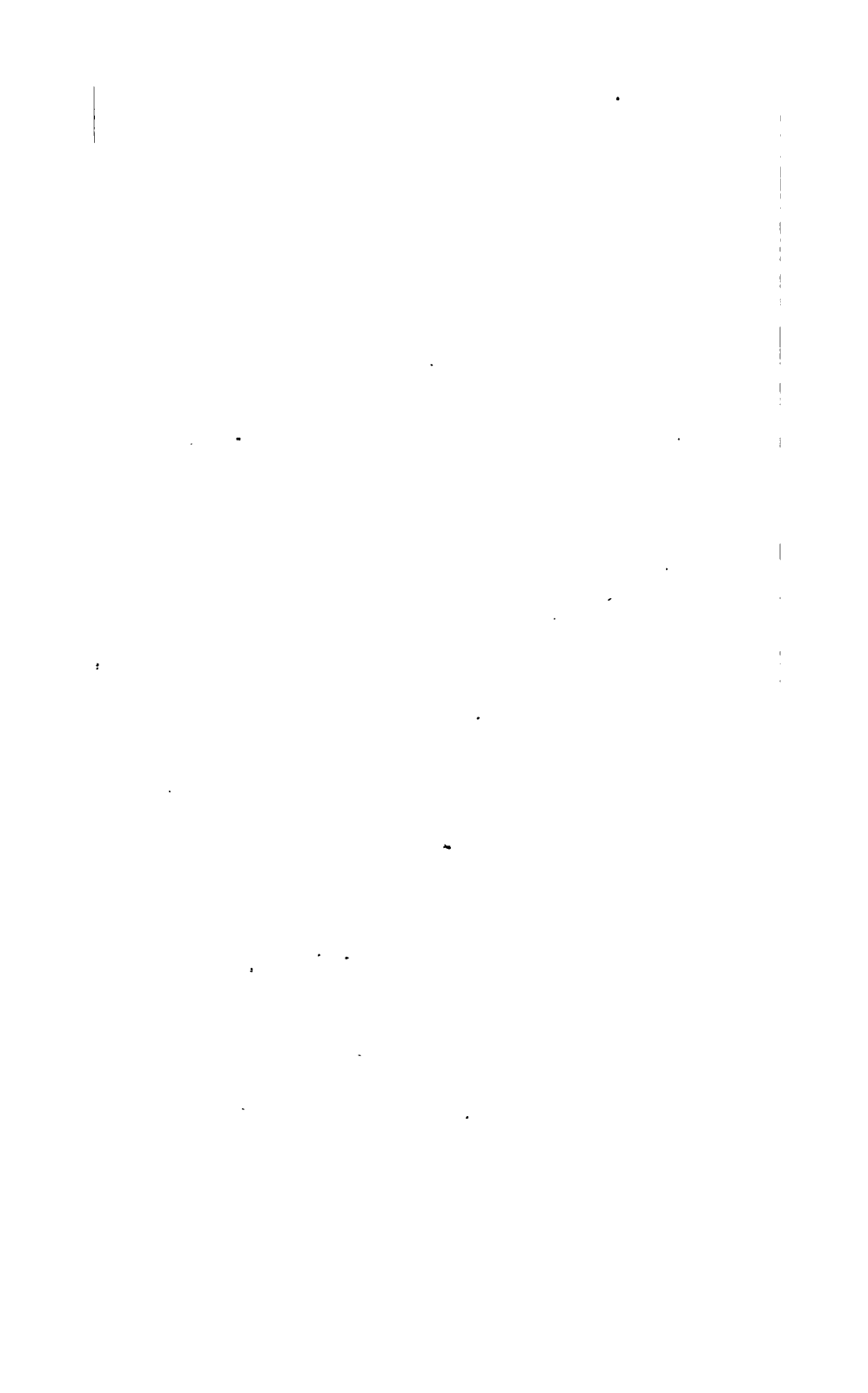
An unwarranted importance is attached to failures, on any given occasion, when they are used to negative the existence of facts which have been elsewhere established by success. It is manifest that the reverse of this should be the process of reasoning, the actual success of one experiment ought logically to outweigh a dozen failures; these may be owing to a variety of impeding causes, which *that* in truth proves not to be necessarily concomitant, or if they occur, that they may be removed. Of all these suggested sources of failure, the chief, it is apprehended, is the taking for granted that the various kinds are alike in their habits, whereas the great secret is the simple, but essential preliminary, the choice of the seed. The practice on this important point will be noticed in its turn, but we hasten to conclude a chapter, which has already exceeded its fair proportions, with reference to the philosophy of the matter, in the words of Mr. Loudon, who in his magazine thus comments on the comparison of two plants of Indian Corn and their ears:—"By comparing the two, our readers will have a very palpable idea of the important difference between the two varieties, and a little reflection will convince the young gardener or farmer, how much of his success in all the departments of culture, will depend on the judicious selection of varieties. Botanical gardeners, we sometimes think, are too apt to overlook the important differences, with reference to culture and product, that exist between such slender botanical distinctions, in



**EARS OF DWARF AND TALL MAIZE.**

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consequence of knowing their insignificance to botanical nomenclature; but no gardener or farmer could raise a crop of ripe ears from plants having the habit of No. 14" (a large American kind) "while plants with the habit of No. 13" (those mentioned at p. 72, as commended whilst growing by Cobbett) "have ripened tolerable crops, *even in very unfavourable seasons*, yet the difference between these two varieties, in a botanical point of view, is of the slightest description."

In these remarks of the late eminent horticulturist, is contained in effect, an admission of the subject matter in debate. He not only points out, as a common incident, that of two varieties of a plant exhibiting the slightest structural differences, the habits of one render it hardy, and suited for cultivation in Northern latitudes, whilst those of the other, require the fostering influences of a warmer climate; but he grants the very point this chapter has laboured to maintain, that one certain variety at least will, for the best of reasons, flourish in our island. In the stereotyped peroration then of forensic eloquence, we may close the argument, with the observation of "that's our case my lud;" and looking in our mind's eye, simultaneously and significantly, both at our last witness and the reader (as the foreman of the Jury) we confidently await a verdict in this important cause of "Maize against Potato."

## CHAPTER V.

THE USES TO WHICH INDIAN CORN IS APPLICABLE,  
CHIEFLY AS AN ARTICLE OF HUMAN DIET, AND  
FOOD FOR DOMESTICATED ANIMALS.

Having endeavoured to refute the notion that the cultivation of maize in England is altogether impracticable, by proving the contrary; it is next proposed to shew the importance of the plant both for a farming crop and as a grain. A fitter introduction to these subjects cannot perhaps be given, than in the words of Arthur Young, who was as much impressed *truly* with the extreme value of the plant, to the inhabitants of those countries, where it could be grown, as he was *erroneously*, with the idea, that its culture in this island, except as a green fodder, would not be attended with the advantages it is the object of this treatise to establish.

The following extract from his travels in France, published in 1794, contains a fair summary of its manifold qualities. "Perhaps it is the most important plant that can be introduced into the agriculture of any country, whose climate will suit it. It is a more sure crop than wheat, its product in the food of man is so considerable, that the populousness of a country, is necessarily very different with-

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out or with this article of culture ; it is at the same time a rich meadow for a considerable part of the summer, the leaves being stripped regularly for oxen, affording a succulent and most fattening food, which accounts for the high order of all cattle in the south of France, in Spain, and in Italy, in situations that seem to deny all common meadows. It is planted in squares or rows, so far asunder that all imaginable tillage may be given between them, and the ground, thus cleaned and prepared at the will of the farmer, is an invaluable circumstance, and finally it is succeeded by wheat. Thus a country whose soil and climate admit the course of 1st maize, and 2ndly wheat, is under a cultivation that perhaps yields the most food for man and beast, that is possible to be drawn from the land ; for as to potatoes, it would be idle to consider them in the same view, as an article of human food, which 99 hundredths of the human species (where maize is grown) will not touch. They have in provinces where the people will live on them, a similar though perhaps inferior merit. But maize has the additional advantage of affording the best food that is known for fattening oxen, hogs, and poultry, by grinding or otherwise preparing the seed ; thus affording a meadow to feed your cattle in summer and grain to fatten them in winter."

Its value and various uses are thus generally stated on more modern authority.\* "The bread

\* Penny Cyclopædia.

made from maize is not so palatable (to some tastes) as wheat or rye bread, but by making it in certain proportions with wheat, it makes a very pleasant food. In the United States of North America (and it may be added in many parts of the European Continent) it forms almost the only bread eaten by many of the people. It is not however in the shape of baked bread that maize is most generally used in Europe, but in boiled messes and soups, as peas are with us; it is not only the ripe grain which is eaten, but the ear in every state, from that of a green vegetable to that of an unripe corn. It is boiled, stewed, and baked; it is a substitute for cabbage or green peas in its early stage, and is used in some way or other to its complete maturity. Nothing can be better than ripe maize to fatten hogs and poultry, to the flesh of which it gives a peculiarly fine flavour. All animals are fond of it, and the young stem cut down quite green, gives one of the best and most abundant varieties of green food for cattle."

These two comprehensive summaries are calculated to impress the reader with no mean notion of the high worth of a product which combines so many excellent properties, and is applicable to so many purposes. The subject is not only a most important one in itself, but has become especially and momentarily interesting at the present crisis, when a populous portion of the Empire is starving from the failure of a crop, which there is no reasonable pros-

pect to suppose can be grown with better success this season. To plant the root of the potato in its degenerated state, is still further to hazard the food, on which millions have been unfortunately taught too dependently to rely, and before a new and more rigorous tuber, by raising it from seed, can be supplied, a substitute, yielding an annual return, must be provided to occupy the fields, and satisfy the famished multitudes for at least the next three years. It is apprehended that already enough has been stated to shew the peculiar fitness for our purpose, in this extremity, of a vegetable which is readily obtainable, and not difficult to cultivate; which is prized by our neighbours, and esteemed a blessing adapted to the wants of man, wherever grown. But a more practical consideration of these qualities, and an examination of them in detail is desirable. Such are the numerous ways in which every part of Indian corn is serviceable, at its various stages of growth, that it may be viewed as a rival to the Cocoa-nut tree in the utility and diversity of its application; and may well be considered by the Americans as of the utmost importance, and worthy of national regard. There is no kind of grain which can be applied to so many purposes, with such manifest advantages, or cultivated with less trouble and expense, proportionate to the amount of its produce.

Let us commence with a consideration of its uses in its great and highest application, as a food fitted

for the ordinary subsistence of man, and consumed by a large proportion of the human race. Although the flour of Indian Corn, by reason of its containing but little gluten, is less suitable for bread-making than that of wheat, yet on analysis it yields a great proportion of sugar, which renders it peculiarly wholesome and nutritious, and adapted for every kind of cake and porridge. Its meal and flour contain considerably more nutriment than rice, and is perhaps, upon the whole, more strengthening and wholesome than any other farinaceous product. There are few constitutions with which it does not well agree, and no other product is so universally suitable for the staple food of a people, fitted alike for old and young, for the inhabitants of the temperate and warmer regions of the earth.

There are various, indeed, numerous modes of preparing the maize-meal, and which though simple and easy, as shewn by a late American authoress, are stated by her to be both palatable and excellent. The taste is generally considered peculiar and not so pleasant as the flour of wheat, to some palates, however, it is at once agreeable, and most persons who continue to use it, eventually become fond of the preparations from both its meal and flour. This is peculiarly the case with the Irish, whose prejudices are fast abating, and of whom it is now a favorite food. It is beyond our attainments to discuss the occult mysteries of culinary chemistry, and beside

our purpose to write a chapter on domestic cookery ; but a short description of the most useful states and modes in which this corn is brought to table, may be desirable at the present time.

The first use of the plant is in the ear, before the grains have ripened, full grown but young, and whilst the corn is soft and milky. In this state it is termed *green corn*, rather because the grains are immature than from their colour, the ears when stripped of the husks, being in fact of a pale yellowish white. It is either boiled, baked, or roasted on the coals or before the fire, and eaten with pepper and salt. The ears would be in season in August and September, and are esteemed a great delicacy by all who partake of them, as well as a most wholesome green vegetable ; far more so than the esculents to which we are accustomed—Cobbett is particularly ecstatic upon their vegetable qualities and sweetness ; he considered that the roasted ears mentioned in Leviticus “ were the most savory and palatable delicacy that was ever eaten by man,” and defies all the arts of French cookery to produce anything so delicious to the taste. He is very minute in his instructions to prepare this favourite dish, as well as on the particular mode he adopted in eating it, so as to have it in perfection. “ The little bags (as he terms the grains) of roasted milk are the sweetest and most delightful that can be imagined.” They are a better substitute for bread than potatoes, and,



when boiled, are in America, often used as such with meat, and even at breakfast, tea, or supper, if the green ears of corn are to be had. The value of this garden stuff is increased by its being in season at a time, when other kinds in use, are either gone out or not come in.—The ears are to be found in a milky state for a space of about six weeks, or, if desired, it might be cultivated in succession for this express purpose. There are always some ears much earlier than the rest, and towards the latter end of the season they grow somewhat hard, but it is affirmed that persons who are accustomed to eat them, like them better in this condition. They contain, indeed, when nearly ripe, more substance and nutrition, and in that state approach nearer to the properties of meal and bread. Our last authority thus sums up his piquant though excursive notices on this subject:—"In the culinary process, there are none of those cullings, and pickings, and choosings, and rejections, and dabblings, and old women putting on their spectacles, to save the caterpillars from being boiled alive; there are none of those peelings and washings as in the case of potatoes and turnips, and digging into the sides with the knife for the eyes, the maggots, and the worms, and flinging away about half the root, in order to secure the worst part of it, which is in the middle; none of those squeezings and mashings and choppings, before the worthless mess can be got upon the table. Nature has

furnished this valuable production with so complete a covering that washings from the purest water cannot add to its cleanness. The husk being stripped off, it is at once ready for the pot." Miss Leslie gives amongst her Indian-meal receipts a mode of making green-corn dumplings, which from the table of contents, arranged at the head of the directions, seem to be a rich dish.

Next, as to *Bread*, the same authoress supplies various receipts for the making of bread from Indian meal alone, or mixed with rye, or wheaten flour. It requires more baking than wheaten bread, and is best when fresh.—She states, that excellent bread may be made of equal portions of wheaten meal and Indian, the latter giving it a peculiar sweetness. When made with rye, it is particularly wholesome, and suitable for dyspeptic invalids. For the making of all kinds of cakes or bread (as Cobbett calls it) at a moment's warning, this article is especially applicable and preferable to those of rye or wheat. The flour of wheat, on account of the very quality (its adhesiveness) which makes it suitable for bread-making, fits it the less for cakes, causing them to become hard, unless other ingredients are used to counteract this effect. Made of Indian meal or flour however, the cakes are light and spongy, and are well calculated to supply the place of bread, even by the choice of the consumers, and are generally considered more wholesome than any preparation of fer-

mented dough. It may be mentioned that the flour from the yellow kinds is popularly esteemed the best for bread-making, the white being usually grown for feeding cattle, or for consumption by the slave population in the United States. It is, however, the experience of one\* conversant with the details of baking in its various departments, and who has given much attention to the use of maize flour in various articles of diet, that the white obtains a decided preference from persons not previously acquainted with either kinds; he has manufactured both kinds for some time past, and states that he sells bread made from the latter in the proportion of a hundred loaves to five of the yellow, the consumption of his meal and flour being in the same ratio.

For the making of *Porridge*, or as it is termed on the other side of the Atlantic, "Suppawm," Indian meal is preferable to oatmeal, and much recommended in cases of indigestion for children. It is used either with milk, broth, or water, and forms a strengthening meal—the Irish already find it more substantial, if they have not even learned to consider it more palatable than their potatoes, or oaten cakes. A mess of this wholesome meal pottage would provide a sufficient breakfast and supper for a working man, and if meat could be commanded, (which every labourer's wages ought to command

\* Mr. Turner, 67, Bishopsgate Within.

once a day), no better adjunct could be found than porridge made with maize meal or flour.—In reference to which matter of cottage economy, Cobbett, in his pithy style, proceeds to relate how he managed in his own farm-house, and thus concludes the narration which comprises the whole art and practice of porridge-making in all its branches:—"Here we get over two meals a day without (wheaten) bread, and one of them without beer.—The bread is a ceremonious affair, and occupies a good deal of time in the making, and the beer, owing to the duties on malt, is expensive, whilst a quart of porridge, as good as ever was eaten by man, and forming a substantial meal, does not cost a quarter part so much as a quart of even poor small beer." He commends, indeed, the virtues of this "good stuff" so highly, in physically strengthening and intellectually brightening a man's energies, that if he do not rank it as food fit for the gods, he prescribes it for the supper of "a Secretary of State or Prime Minister," but whether American or English, he does not state.

We next come to "*Mush*," which is a sort of half-pudding, half porridge kind of dish. It is a great favourite either hot or cold, and usually eaten in the latter state, with milk. "Here (writes our Maize Pundit) is a most excellent pudding, even if there be no milk to eat with it, and a very good substitute for bread. It is not like the miserable potato, a thing that turns immediately to water, nor is it like

a pudding made with flour and water, which is hard and closely clung together, indigestible and, of course, unwholesome. The mush, so far from being hard and lumpy when cold, is quite light, and recommended by physicians to persons who suffer from indigestion."—The corn-meal and flour is considered, in fact, by many to be more wholesome than wheat flour in all its preparations, but in this particular form it is the most highly esteemed by maize growing people. In America mush is used in every house, whether the owner be rich or poor, and is stated to contain more nutriment than can be got out of the same quantity of wheat meal. It is eaten at the best tables, cooked in a variety of ways, both hot and cold, either with milk or cream, or with butter and sugar; when cold, it may be sliced, and fried in butter or gravy. Miss Leslie states that mush is the simplest mode of cooking Indian meal, and it would seem, from the use made from it in this form, as practically the best. It resembles the burgoo of the Scotch, or the stirabout of the Irish, but the dish is infinitely sweeter and more nutritious thus made than when oatmeal is employed.

"*Homany*"\* is Indian Corn shelled, each grain being divested of its skin, and then dried.—After having been soaked and well baked or boiled it is eaten with butter, pepper, and salt, either alone or with any

\* Mr. Joseph Martin, of Rainhill, near Liverpool, manufactures this nourishing article of food in great perfection.

sort of meat, particularly corned beef, pork or bacon. If properly prepared it is considered very wholesome and strengthening. It is also used to thicken soups, for which purpose it is much superior to peas.

"*Samp*" is also skinned corn, but afterwards pounded or ground very fine, when it is soaked and cooked in a similar manner to the last preparation. It is very palatable when eaten with cream, sugar, and spice, or with butter, sugar, and nutmeg. For invalids, made thin, it furnishes a nutritious gruel. Cobbett much commends it, but assigns a more humble position for it on the table. "When samp is made, meat, he says, should be boiled with the cracked corn, and it is far preferable to anything put upon the best tables, under the name of pea-soup.—There must be no skins in the samp, which is not merely to be cracked, but the skins beaten off, as the shells are from buck-wheat, or from oats before ground into oatmeal."

But this well nigh suffices, for "*affaires de cuisine*," it remains but to add, that the Indian meal or flour is applicable for making the same articles of food as that of wheat, and for some of which it is indeed to be preferred. All sorts of nice things in the shape of tempting puddings, cakes, biscuits, buns, crumpets, muffins, pan-cakes and "slap jacks," are producible under the hands of an expert housekeeper, suitable for breakfast, dinner or tea; but for particulars, concerning which we must

refer the curious, or the hungry, to Miss Leslie's Book of Maize-cookery, and conclude this department of our chapter with some economical considerations on the subject—"The same reason (says Cobbett) applies in every particular to the use of corn flour, in preference to that of wheat, especially in this case of puddings, the relative cost will, at all times, be one third at least, against the wheat flour. At present with our scarcity of wheat, and with the want of knowledge, generally speaking, as to the use of corn flour, the difference in the expense is quite enormous; and, this being so clearly on the side of the corn flour, where is the man who has not money actually to fling away, to find an apology for not insisting upon the use of corn flour in his family; and that too, when his own palate convinces him that it is better than the other? We all know what a fuss has frequently been made in time of dearth, to get *substitutes* for *bread*.—Rice, amongst other things, has been resorted to. Rice is a poor, meagre, feeble thing, hardly sufficient to sustain life in a labourer, especially in a country where the exertions of the body are necessary to keep that body warm in the open air. It does very well for creatures that loll about in the sun; but can never be sufficient, in whatever quantity, and however cooked, to give due support to the frame of the labouring man in a climate like this."

Thus much for our subject as food for the million

—let us now consider its properties for feeding those many docile creatures, that minister to the other wants of man, or aid him in his labour.

As the first fruits of the plant are, in the maize-growing countries, usually applied to the feeding of *pigs*, which is a use peculiarly desirable in Ireland, (for whose necessities the introduction of this grain into Britain will afford especial relief,) we will commence the list with this application of the crop. The under ears, called on the other side of the Atlantic, the “nubbings,” are chiefly used for this purpose, like the under ears of wheat and other grain, they are not only inferior in size, in ripeness, and number of grains, but are likewise more perishable than the rest of the crop.

As soon as the husking time begins, (of which an account will be given in the last chapter,) the pigs receive these under ears in the way of notice to get fat. “Little ceremony is needed in the operation of feeding them; the nubbings, and when they are gone, the perfect ears are tossed over to the hogs in the sty, where they will get at every grain. Even the little pigs at three weeks old, while with their mother, will begin to crack the corn, and, at the end of two months, they eat the corn so well and so much,” that the result is, to shorten Cobbett’s narrative, they early wean themselves, in a very natural and orderly manner.

“Now how superior is this diet (he observes) not to that only of the miserable human beings in Ire-



land, but that of the far greater part of the peasants in England, from whose labours come all that we eat, drink, wear, or use. The English farmer knows that though with time an old hog will get fat upon whole peas and beans, it requires a long time to do the business, and that in the case of beans particularly, the quality of the meat is vastly inferior to that which is fattened upon barley-meal."

To the poor man who keeps a pig or two to enable him to pay his rent, whilst he himself, by dint of early hours and hard toil, earns his stinted daily bread, a plot of Indian Corn would be a most valuable resource, yielding him not only a most abundant return in quantity and quality, but saving the additional expense of buying or grinding his barley for meal, and his tub or sacks to store it.

Next as to the feeding of *cattle*, we can do no better than follow the practical experience of our maize authority, condensing his remarks and excluding his excursive vagaries. "*Sheep* (he states) will get as fat as sheep can get by living solely upon (Indian) corn. It may be given to them either in the ear or shelled. It ought to be given in a clean trough sheltered from the wet and snow. Every grazier and farmer knows that it is next to impossible, do what you will, to keep the flesh of the Lincolnshire sheep upon their backs after taking them from their rich pastures; yet some which had been bought the previous winter, and fed on corn in my yard, not only did not lose flesh, but actually

throve upon it, and the farmer well knows that that which will add fat to a Lincolnshire wether, which is already fat, cannot fail to fatten any other sort of sheep. But the master-work of farming with regard to sheep is the rearing and fattening of house lambs. To do this, oats, bran, grains, cut chaff fermented, all sorts of schemes are resorted to, to make the ewes give milk and to give the lambs a little food at the same time, which shall keep their flesh white and help to fatten them." "Away goes all the fuss then about *making* house-lamb as it is called. With the help of Indian Corn house-lamb will make itself, and corn is the fattening stuff of all the early lamb in America."

"As a food to fatten *oxen and cows* at the manger, the corn should either be given to them in the ear or else ground into meal, for if they have it in the shelled grain they are apt to digest it partially. Whoever has a mind for a prize ox, sheep or hog, must make use of corn-ears in the beginning, and corn-meal at the end; the latter, though more nutritious is not so heating, as barley-meal, and is therefore excellent for cows, which give milk for butter; when fed upon corn-meal, a gallon mixed and well rubbed together with about half-a-bushel of fine cut wheat straw, or what is better, Indian Corn tops, cows will thrive well and give plenty of butter, and that fine and yellow, and of sweet flavour:" or

the meal may be mixed with warm water and formed into a pottage.

The following quaint description of an American farm yard may be here introduced. "A farmer goes to his corn crib as often as necessary, and carries out a parcel of ears on his shoulder to a piece of pasture land, or into an orchard near the farm house, and there leaning the basket on one side, he walks along and lets the ears tumble out till he has covered a space of sufficient length, to accommodate all the feeders conveniently. Then the oxen, sheep, and pigs are driven to the spot, for which they are always ready, and to which the poultry most punctually come of their own accord. The oxen, in taking up the ears and grinding them, let grains and bits of ears fall; the sheep while they are feeding upon the ears let some tumble out also; the hogs do the same. The oxen will not pick up dirty bits, and therefore, when they have gone over the prime part of the meal they look over it again, and poke away the pigs with their horns, as long as there is any part of the corn remaining which they have a fancy for. The sheep leave off as soon as all the clean corn has disappeared; the hogs go on taking up the single grains, dirt and all, and the poultry taking care to keep skipping out of the way of the grunTERS, pick up the crumbs."

To descend from the lords of the stabling to the

humble feathered tenantry of the farm-yard, maize is the most admirable food on which both to feed and fatten *poultry*. "They are extremely fond of it and will swallow the grain whole.—The finest turkeys in the world are fatted in this way with the least possible trouble. There is no grinding, no messings of barley meal to fatten poultry with. All you have to do is to give them a sufficiency of shelled corn, tossed down to them in the yard; and they will all of them, turkeys, geese, ducks, and fowls, become as fat as fat can be. If you wish to have fresh eggs in winter, you need resort to no steeping of barley in beer, or in wine, or to giving the hens hemp-seed, or the seed of nettles, as the French do, give them plenty of corn whole, and you will have fresh eggs all the winter long. To the very little chickens or young turkeys, you must give some in a cracked state, but they very soon take it whole." This is Cobbett's plan, other farmers mix the meal of the Indian Corn into a soft dough, with cold water in summer and warm in winter; put in shallow pans and given to the fowls twice or thrice a day: but this is more adapted for feeding young chickens.—If mixed with treacle, the poultry fatten on it very fast indeed. It is well known that in order to have a fat turkey, or even a really fat fowl, farmers' wives are compelled to resort to a mode of proceeding, known under the cant term of "cramming." Cobbett's

account of this method of forcing turkeys into fatness, as practised in Norfolk, may be interesting to those to whom the process may be a novelty. "If the farmer's wife have a dozen of these birds to cram, there she sits (for she can trust no one else to do it) with a leathern apron before her, with balls of barley meal, rolled into an oblong form, and with a bowl of warm milk or some greasy water, taking one turkey out of the coop at a time upon her lap, forcing its mouth open with her left hand, putting in the balls with her right, and stroking with her fingers the outside of the neck to make them descend into the craw, every now and then pouring down a spoonful of the warm liquid. It is always a disagreeable and troublesome job, it takes up a good deal of time, and these things cannot be made sufficiently fat (on barley) without this operation." Surely so simple and efficient a substitute for this tedious process, as that of scattering the grains of Indian Corn in the poultry-yard, is worthy of adoption.

But the virtues of this grain are not confined to the fattening of animals; it is applicable also to the formation of muscle, and affords a food capable of keeping so dainty a creature as a horse, in good workable condition. "Corn shelled, or in the ear is the very best food for horses; they will work longer upon it, go quicker, bear heat and cold upon it better than when fed upon any other food: those who have

observed the life which the American horses lead, under conditions, which would absolutely kill every stage-coach horse in England, will want nothing to convince them of the excellence of this food, which contains so much more of nutrition in proportion to its bulk than any other thing that a horse will eat, and that he can eat with safety and convenience. When fed upon corn, the quantity usually given is about one third of what we give in oats.—In winter, when a horse has little to do, a pint in the morning and a pint at night, mixed with finely cut straw is the proper stint, and three times that quantity is at all times enough. The corn is mild and fuller of nutrition than wheat itself, quantity for quantity." It is however to be observed here, as in the case of poultry, neat cattle and sheep, that few of them take to eating the corn heartily for a day or two, if given to them in the hard grain, although, after having once digested it they will leave all other food untouched, so long as a single grain of this is within their reach; but it is as a rule better to soak it twenty-four hours in water before it is given to horses, for in its dry state it is apt to wear their teeth.

But one of the most important uses to which maize is applied on the continent of Europe, and might be most extensively and advantageously employed in England, is its cultivation solely for the purpose of being cut green as food for horses and

cattle; used in fact in the same way as young clover or lucern. Its young stems and leaves abound in sweet and nutritious matter; and there is no plant which gives so great a mass of green food as maize, and the produce is as valuable as abundant. "It may also be dried into hay, and will keep good for at least a couple of years; but in this state the stems should be bruised and soaked before given to cattle, as they get too hard for mastication by keeping. When planted, however, to ripen for a crop of grain, it likewise yields a valuable green produce in its tops and leaves." We shall have occasion, when writing on the management of the crop, to refer to the cutting off and stripping them for this use; but Cobbett's observations in reference to this operation may be inserted here. "You have now a precious deposit for the winter.—It will be of greater or less value, just as hay is, according to the weather, in which you have harvested it, but it is liable to no inconvenience to which hay is not liable, and weight for weight and weather for weather, an acre of corn tops and blades will give more nutriment to cattle and is, of course, more valuable. These dried tops and blades are by the American farmers reserved as the food of their horses, race as well as cart horses, and oxen, in March, April and May, before the grass comes, and when the cattle have the greatest labours of the year to perform; cut up into chaff and mixed with horse-

corn they form an excellent fodder. The cobb or core of the ear (left after the grains are separated) thus cut up or ground, would be similarly serviceable in the stable or cattle shed, to mix with the Indian Corn when found too stimulating, eaten alone. In a word, there is no part of the plant which domestic animals will not eat; it abounds in sugar from the top to the root, and is therefore rendered peculiarly grateful and wholesome.

Before we conclude this chapter on eating, a few words may be hazarded on the subject of drinking. That Indian Corn would make excellent malt, and become a valuable substitute for barley in the production of that important article of English consumption, is scarcely to be doubted. In America, Cobbett states, that it is used in the making of spirits; and he was informed by a grower from Van Diemen's Land, that it had been malted there, and made the finest and strongest beer. The art of making malt, consists in the conversion by artificial means of the starch of any given grain (in practice, as it is well known of barley) into sugar. It may then without a great effort of reason be concluded, that if the incipient germination of the latter corn, will yield a sufficient quantity of sugar for this purpose; the acrospire of maize, from the plant possessing to a high degree the property of elaborating that substance during its growth, would produce



a greater quantity and render this grain peculiarly suitable for malt. At the present season it would have been a most appropriate substitute, for, owing to a deficient harvest of barley and the increased value of every species of grain from the general scarcity of food, some difficulty is being experienced in the procuring of a sufficient quantity of the usual malting material. Would it not be worthy the attention of our great brewers to consider, whether the importation of Indian Corn would not be advisable for conversion into malt on the present emergency? It is apprehended that the intelligent maltsters of Norfolk and Hertford, would find no difficulty in applying their skill in the preparation from it of an excellent article for brewing. According to Meyen,\* "several fermented liquors are prepared from maize, which were known in Peru at the time of the Incas, under the name of Chicha. The chicha, which is the common beverage, is like the Prussian white beer, or, still more, the weak beverage which is known in many parts of Germany by the name of Broihan. Other kinds of chicha taste like cider, and become very strong by age. I have tasted (he says) cider, which was found in an ancient tomb, and which must have been at least 800 years old, and found it to be like alcohol. On the sides of the

\* Geography of Plants, published by the "Ray Society."

Gordilleras there is everywhere abundance of chicha de mays."

"The stalk of the maize is extremely saccharine, and not only is there a honey-like syrup prepared from it, but the stalks are crushed in the same way as our sugar-cane, and a well-flavoured brandy is obtained, which in Mexico is called Pulque de Mahio, or Pulque de Tlaolli."

That the whole plant indeed contains a very large quantity of saccharine matter, is established by experiment and inferred from its peculiar quality in fattening all animals that feed upon it. This subject has lately attracted the attention of chemical analysts, and is thus referred to in the article "Zea" of the Penny Cyclopædia.

"A new application of the maize has been lately proposed.—It is found that previous to the ripening of the fruit the sap of the maize contains a large quantity of sugar. If this sap is collected at the proper season of the year, the sugar may be easily obtained from it, and in such quantities, it is stated, as would render the cultivation of the maize for this purpose much more profitable than that of the sugar cane. Professor Croft in a paper read at the Linnæan Society, in February, 1843, states that experiments had been made on this subject in Indiana, from which it appears that the sap of the stalks of the maize contains more than three times as much

sugar as that of the beet, and five times as much as that of the maple, and frequently exceeding in quantity that of the ordinary sugar-cane as grown in the United States. The preparation of the sugar is also stated to be much more easy than that obtained from the sugar-cane. Another advantage also is the rapidity with which the maize comes to perfection, as the juice may be obtained from seventy to ninety days after the planting, whilst with the sugar-cane it requires eighteen months. The refuse from the stalks is found to make an excellent fodder for cattle. The quantity of the sugar is said to be increased by destroying the ears of corn during its growth."

The Indians in the east and west have their cane, the Americans their maple, the French their beet, what should prevent the English from growing their maize to yield them sugar unsullied by slavery? Experiment proves the practicability of the scheme, advantage suggests it as valuable, and humanity encourages the attempt. The establishment of sugar-boilers for the extraction of a necessary article of diet in lieu of the distilleries which convert food into poison, would confer an inestimable benefit upon the country by improving the moral and physical condition of the people.

There remain a few other, although minor purposes, to which this useful and important plant may be applied with profit and convenience. First the *Husk*

consisting, as we have seen, of the delicate sheaths which envelop the ear, is used in all corn-countries for stuffing mattresses and chairs, and for such other purposes as upholsterers employ hay or straw. For such uses they are extremely applicable, being elastic and durable, and not liable to crumble into chaff, however long in use. The husks nearest the grain should be selected, being the finest and toughest, and therefore more elastic than the outer coverings. These qualities increase in proportion to their inward growth, till the texture of those nearest the grains is that of coarse silk. They are prepared by being divided and soaked in hot water. Another great advantage they possess over the stalks of other grasses, arises from their not harbouring insects. As a substitute for hair even, if the finest were employed, they are but little, if at all inferior. The corn-husk would be found an excellent material in the stuffing of coach-cushions, for instance, and easy chairs, whilst from its profusion and consequent cheapness, it would be most serviceable in providing comfortable bedding for the poorer classes, and indeed for the richer, if health were studied, who would lie at greater ease on a husk mattress, than on a hair one, and with greater benefit in a sanitary point of view, than smothered in eider-down. Many persons in England may not have seen either the plant or an ear of maize, though few, it is apprehended, have not seen these husks. It is in the coarser or outer

of these sheaths that oranges come to us packed in the chests imported from Spain. They may be likewise manufactured into an excellent paper, a use for which they would be at once available, owing to the lately increased value of the raw materials for printing-papers, the demand for which has become so considerable. A beautiful writing-paper is made from them in Italy. The husk might probably also be employed with advantage for other purposes in the arts, requiring similar qualities to those possessed by paper-making substances.

So much for the husk, now for the *cobb*, or the cylindrical pith-like core upon which the grains are arranged; this is employed in America in the place of corks, and for common use, are considered by the farmers there, to answer remarkably well. But though useful for ordinary purposes, they are certainly not equal to those prepared from the bark of the cork-tree; nor would they perhaps rival those cotton-stuffed caoutchouc-covered stoppers, which so considerably puzzle the common cork-screw in its attempt to extricate them from bottle-necks. The corn cobb is stiff and tough, tapering from the point to the base; and provides therefore ready-shaped corks, to fit the neck of any bottle that has any pretension to respectability in dimensions. It requires only to be snapped off to the desired size. A second use to which this rachis or pith may be applied is as a fuel, it gives a pleasant heat, not feeble like the

straw of wheat, nor so slow in lighting as wood. It burns without odour, and is thus used by the Americans, who, it will have been observed, are most deeply impressed with the valuable qualities of the maize, in its numerous applications to the necessities and conveniences of life. For temporary purposes, or in aid of more costly fuel, corn-cobbs will be found a useful article, particularly for the oven. The grinding or cutting these cobbs into chaff has been already noticed.

Here then is presented a vegetable in friendly and honourable rivalry with wheat, as regards its importance to the European, and with the cocoa-nut tree as regards the multiplicity of its uses to the Asiatic.

The preceding sketch may have tried the patience of our readers, but they may be assured, that the examination of the properties, and value of its subjects, remains unexhausted—what has been here given however suffices for our purpose, and it is trusted will prove sufficient to attract the attention of many to whom these details may be new, and impress all with the extreme importance of naturalizing the stranger in our Islands. What one production have we to compare with it, in the diversity and utility of its applications? There is no other plant capable of cultivation in European latitudes, which in quantity, or of such value in quality, is so available, in all its parts, as Indian corn.—It yields a wholesome, nutritious food for man, in different

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states, and in various shapes ; it provides an abundant fattening fodder for his domestic animals, in the several stages of its growth, alike in its leaves, its stalks, and ears, and thus in another form supplies their master's table. It is moreover ready to serve him in other modes, it possesses qualities which would render it available for the production of the favourite English beverages, and affords us sugar without being made partakers in the iniquities of slavery. In fine, for food, for drink, for all its uses, it is not only peculiarly valuable in itself, but at the present crisis especially needed.

## CHAPTER VI.

A DESCRIPTION OF THE KINDS OF MAIZE BEST ADAPTED FOR ENGLISH TILLAGE, AND THE MODE OF CULTIVATING THEM.

In arriving at the conclusion of our enquiries respecting the importance, we come to the commencement of the *practical* application, of our subject—*The Culture of Indian Corn in these Islands*.—If the previous statements regarding the many useful and excellent qualities of this plant be considered, and the fact of the expediency, if not necessity, of introducing without delay a fit and profitable substitute for the potato, be admitted, no further introduction need be written to the contents of this chapter. We will therefore, in accordance with a well-known classic precedent, plunge at once into the middle of the subjects left for our consideration.

The choice of seed stands first in order, the importance of which has been already enforced in chapters 3rd and 4th. On a review of the facts attending the trials which have been made, at various times, and in several parts of the kingdom, it appears that the chief cause of failure may be attributed to a neglect in the *choice of proper seed*, produced from plants accustomed to the peculiarities of a European



climate, and fitted from their natural habits, to accommodate themselves to the vicissitudes of our latitude. That such varieties exist might be inferred from the remarkably wide range, which we have shewn (in chapter 2nd) characterizes the growth and development of the species; a property possessed by all the graniferous tribes as a class, but more particularly marking this prolific corn-grass. This conclusion has been confirmed by experiment, and it may be taken as proved, to the extent to which it has been fairly tried, that *the early dwarf kinds* would, with little care and attention, at once ripen their grains, and thrive in the fields of the Southern and Midland counties of England, and the productive agricultural districts of Ireland. The circumstance, that amongst the eastern varieties acclimated in Europe are mostly found the sorts desired, might be reasonably anticipated from the above consideration; and the fact that the particular kind introduced by Cobbett, flourished so well, and produced so abundantly, supplies a comment which the most cautious must accept as a strong presumption in favour of our argument. These observations are of course to be taken with special reference to the production of ripe grain for corn—we shall in the sequel consider the growth of the plant to supply a crop of green food for cattle; observing, in passing, that it is manifest, the large and luxuriant sorts will be the most appropriate for this purpose. A more important

boon could not, at this crisis, be conferred upon the country, than the sowing a fair portion of our fields with maize in the ensuing spring. It is suggested to agriculturists that the best practical plan would be to apply at once, to their seed-merchants for a supply of seed-corn from France or Germany.—Cargoes could be expeditiously obtained by the Rhine, or the Baltic ports, in time, as we shall proceed to shew, for this year's sowing. Some samples might be obtained from the market-gardeners and nursery-men, in and around London, or in other localities in the southern counties, but not, as it is apprehended, in sufficient quantities for the present exigency. Whatever quantity, however, can be obtained from these latter sources, it will be desirable to procure, on account of the seed having been of home growth, and therefore acclimated for longer or shorter periods.—Or, if America were, for any reason, considered a more accessible, or desirable country for exportation, the Northern States, New Brunswick or Nova Scotia, would supply varieties similar, in some respects, to those of France. It might not indeed be an unprofitable speculation, if a few enterprising merchants were to anticipate such orders, and provide a supply of maize-seed from the quarters designated.—Such providence would be patriotic, and if the provision were not appreciated, and applied in the manner desired, the adventurers would still find a market for their cargo as an article of food. If such a course

be adopted, particular attention, it need scarcely be observed, should be directed to the procuring of corn, not only with the object of using it for seed (which for this purpose should be imported in the ear), but also with special reference to its being the product of such varieties of the plant as answer the description, and conditions before pointed out, and which we will now consider more in detail.

The great desiderata on this head, are the following—first, the plant should require but a short period, within which to arrive at maturity, so as to permit it to be sown late enough to escape injury from our spring frosts; and secondly, that the head flowers should expand their blossoms sufficiently early to produce the pollen, to be shaken upon the silken tassels of its ears, in the warm early days of our summer months; this being an essential and critical stage in the growth of all plants, especially of those, whose stamens and pistils are, like the objects of an unhappy marriage, “separated and living apart.” These conditions are fortunately generally combined in unison with a third requisite, that is, a short stem from three to five feet high, so as to be capable of resisting the gales, which occasionally sweep over and damage our corn-fields, before the commencement of harvest. Indian Corn, however, even in America, is not subject to be “laid,” as the straw-stalked cereals. The stiffness of its stems, and the peculiar faculty which it has of throwing out, with

remarkable activity, supporting roots from around its last knot, prevents it from being overthrown. It will be found that the European varieties generally unite all these, to us, important characteristics; and some of the natives of other quarters of the globe possess them in a remarkable degree. Mention has been already made of a continental dwarf red-grained variety as recommended by Mr. Loudon for English culture, better counsel could not be followed. A reference was also made in the fourth chapter to four other dwarf kinds, which had been grown at Waltham Green in 1830, with complete success. Two of these were not indigenous in Europe; one was Egyptian, called "Chicken Corn," a remarkably diminutive sort, not more than eighteen inches in height, but very prolific and ripening thoroughly in the year alluded to. The other was North American, obtained from the Sioux tribe, and termed the "Early Golden Corn," a very early and excellent sort. The third variety was the "Forty days' Corn," from the Neapolitan districts, so called from the extraordinary rapidity of its growth and maturation. It is frequently sown after the wheat has in that country been reaped. The fourth, reported as the most abundant bearer, was no other than the Artois Corn, introduced by Cobbett, of the virtues and capabilities of which, it is presumed, nothing more need be said; the fourth chapter contains abundant testimony, establishing it eminently worthy our

attention,\* the shorter ear, figured in Plate II, represents the produce of this excellent kind, the culture of which is particularly recommended for our English late crop; but it would be very desirable to introduce varieties whose habits would allow them to ripen in less time than this requires.

It is also considered unnecessary to give a further description of the numerous varieties, either of eastern or of western origin, possessing the qualities just noted, from which appropriate seed might be selected for cultivation as *Corn*, a notice of those which it would be most desirable to grow for green fodder or hay, being reserved for subsequent attention.

With a plant ranging in height, from eighteen inches to twelve, and even fifteen feet, and in time of reaching maturity, from six weeks, (not to reckon the Quarantine Corn) to nearly as many months, "ample space and verge enough" is afforded for choice to suit almost every quarter of the globe.

This view is borne out, not only by the previous references in its present range of growth; but by the facts stated by Humboldt, who relates "that vast maize fields are to be found on the plateau of Mexico, at a height of 8680 feet, and in Peru on the road between Lima and Pasco, maize is cultiva-

\* It appears by a Dublin Newspaper that a dwarf variety, about four feet high, has been grown last year by Mr. Tierney of Clontfrib, perfectly matured its grain.

ted as high as 3824 metres, almost 12,000 feet; nay, at the time of the Incas, it was grown by artificial means on the island of Titicaca, in the great lake of the same name. On that island, at the height of 12,800 English feet, was the celebrated temple of the sun; in that the Incas offered some of the maize grown in the island to the Deity, and the rest was carried by the virgins devoted to the service of the sun to the other cloisters and temples of the kingdom, whence it was distributed amongst the people. The people believed that whoever preserved a single grain of this maize, would never want bread during his whole life." A conceit, which reminds one of the sage maxim, propounded by careful parents, to a juvenile recipient of his first pocket-money. Meyen in his "Geography of Plants" also observes that "on the western coast of Europe maize is grown in  $45\frac{1}{2}^{\circ}$  north latitude, on the Rhine to  $49^{\circ}$ , and in our country (Prussia) even in  $52^{\circ}$ , large and abundant crops of maize are raised in gardens, yet with us there is little taste for this fine grain, and therefore its culture is neglected. Maize is only grown to adorn our gardens, and the rich produce is given to cattle. In Germany maize is most extensively cultivated in the fertile valley of the Rhine, known by the name of the Bergstrasse."

Much useful and practical information, on all these questions, could be obtained from intelligent gardeners and nurserymen, particularly from those

resident in the localities, in which the experiments previously mentioned have been made. Referring then our readers to these sources and authorities, for such further particulars, as they may require, we will now proceed, on the assumption that they will get their seed, to shew them how to grow it.

As the writer disclaims sufficient knowledge, from his own personal experience, to expound the practice of farming, as applied to the cultivation of Indian Corn, he purports to draw largely upon the practice of those, who have devoted their attention to this species of husbandry. Our learned Corn-Pundit will supply us with much practical advice. His introductory observations, bearing upon this question, may be here inserted:—"All our (common) grain, upon an average of years, comes to perfection in the course of one single month; so that, if that month happen to be untoward, the *whole* of our crops receive great injury; and sometimes the injury is so great as to produce an apprehension, if not real danger, of something approaching towards famine. If the evil do not extend thus far, it produces, at the least, very great distress; and, as it may happen in this very year also, and so it must always be in a greater or less degree, this evil produces great embarrassment to the government; and cases may frequently arise, when the government, embarrassed from this cause, may be induced, and even compelled, to endure insults and injuries from foreign nations, to which, otherwise, it would not have submitted."

“The simultaneous ripening of our crops of grain, causes a very partial and injurious distribution of the labours of the year. The harvest month, as it is proverbially called, is a month of bustle and of hurry indescribable: all is at stake; not a moment is to be lost; any demand for wages must be submitted to: to this succeeds a dead calm, in which there is nothing to do: wages acquired so suddenly, are but too frequently as suddenly dissipated: and, after a long and indolent autumn, winter comes, and meets the labourer with not a farthing of his harvest earnings in his pocket. Now the Indian Corn furnishes employment until the end, and after the end of October, and well rewards the man who gives the employment.\* This is one of the most important considerations belonging to the subject.”

Maize is generally considered to require a rich soil and plenty of manure; but it is in practice planted in all sorts of soils except poor gravels. It thrives best however on a warm, moist, light soil, such as a friable sandy loam, and well repays high and attentive cultivation. The following are Cobbett's directions, respecting the preparation of the ground and the season and mode of planting.—“Indian Corn, like other grain and most other things of any value, grows best and is most productive in good

\* This observation of course, applies only to such varieties as ripen late. If the earlier maturing kinds were tilled at the same time, further employment would be given by an earlier harvest.



land ; but, with some very few exceptions, with regard to the very wet and stiff clays, and with regard to shade particularly, I know of hardly any land in England, on which there might not be produced a tolerably good crop of Indian Corn, which would certainly succeed in numerous cases, on land much too poor to yield a good crop of wheat, or even a good crop of barley, or oats or rye. I have seen it grown in America, in fields which would have borne neither of these, and this in thousands and thousands of instances. It is regarded as what we call a *fallow-crop*, as well as a productive crop." "In England an old *ley* ; that is to say, a field which has lain for two or three years after barley and clover, would do very well ploughed up in February, and planted either in hills or in rows, with just a little manure immediately under the seeds to give them a start, as the Americans call it. It is the *after cultivation* upon which the corn planter may, on the Tullian principle, place his principal reliance."

"The *best* preparation for corn, I should think to be the same as that for barley ; the land prepared in precisely the same manner, and to be ready for planting in barley-sowing time. There is too, one very cogent reason for preferring this preparation to that before-mentioned ; and that is, that here, you are not exposed to the ravages of the black, or rather the brown grub, or the wire-worm, both of which are apt to be found in great abundance amongst

the crops that succeed *leys*, or any ground that has long been unploughed.

“But the corn is by no means nice, like barley ; it does not require a previous sheep-folding and several ploughings, and such very fine tilth all over the surface ; it may come after wheat or any other white-straw crop, so that the ground has but a good deep winter ploughing, and another ploughing and a good breaking to pieces in April, and so that it has a little manure along the drills, if it be to be in rows ; or, upon the crossings, if it be in hills.

“If the soil be very stiff, it must be well laid up to take the frosts of the latter part of the winter, particularly to be dried by the winds of March, so that it may be made fine in April. I should not recommend to plant it where the clay is stiff, where the bottom is wet, or particularly near the shade of trees ; for, though it will do pretty well in a widely planted orchard in America, where the sun sends his rays through an apple-tree with such force, it will not endure shade in our country ; and even in the shade of America, it seldom comes to much when near to the north side of a wood.

“Any land that will bear oats, not wheat or barley, but oats, or even buck-wheat, may be made to bear a tolerable crop of Indian Corn. On gravel, on chalk, however near the surface, corn will do very well, if aided by a little manure, and especially by good summer tillage, for which the distances at which it

is planted furnish most amply the convenient means."

"In Long Island (United States) the season for planting is, from the tenth to the twentieth of May; that is to say, so as to get the corn out of the ground as early as possible, without exposing the young plants to the pinchings of the frost, which is frequently pretty sharp in that country so late as the first week in June.

"The corn plant is not destroyed by such a frost, but though not destroyed it does not like it; and it tells you that very plainly by the yellow colour, that it assumes the second day after it has suffered from the frost. It remains in this yellow state till there comes a warm night, and then it goes back again to its colour of bright green. But, these frosts, repeated upon it, give it a great check, from which it does not very soon recover; so that the Americans endeavour to hit the precise time to get the plants up as early as that can be done, without running the risk of a check, which shall more than counter-balance the earliness of the germination. The point of time is, with them, from the tenth to the twentieth of May.

"This season was chosen for the planting of my corn this year; but I am convinced that I was too late. We have, indeed, sharp frosts sometimes in May; and at Kensington, I have had all my kidney-beans completely cut off, and my strawberry blossoms rendered fruitless by a frost in June. This, however,

is not the case one year out of ten, at the most; and even a frost like this *would not kill plants of Indian Corn*. It might greatly check them: it might even make the tips of the blades turn brown; but the plants would speedily recover, especially if well treated, from the effects of any of our frosts in May or June, which are by no means so sharp as those which they have in Long Island at that season of the year. I shall, therefore, plant my corn (in future) between the fifteenth and twentieth of April. This will bring it all up by the seventh or eighth of May, which is about the time for closing the barley-sowing; and it is desirable on another account, that the planting should take place at this time of the year."

Though this is the time to be chosen in ordinary cases, the choice will be somewhat regulated by the season. Cobbett had at the time he wrote (29th Oct.) in his garden at Kensington, some corn planted in the first week in June. "It is (he observes) perfectly ripe and hard, though I mean to let some of it stand till Christmas, in order to ascertain to what length a lazy farmer may go without incurring the destruction of his crop." An instance of a prodigious crop obtained by him upon three quarters of a rod of ground has been already given. This was planted on the *ninth of June*, the seed having been soaked twenty-four hours before it was sown. His large field in the following year, was planted between the

seventh of May and the first of June; a part of it in the very last days of May; and the whole crop was secured ripe and hard.

"If circumstances demanded it, he continues, I should have no hesitation to plant until the latter end of May; and, if the ground were rich, even so late as the first week in June. *Vetches* might be sowed upon a wheat stubble, fed off by sheep in May, the plough following close to the heels of the fold, and with a deep and clean ploughing, and good harrowing and rolling, an excellent crop of corn might succeed. Now, this is what I venture to say may be done upon any good land, which has not a wet bottom. A crop of broad cast wheat, coming off in August, a crop of winter tares fed off in May, and a crop of corn to come off at the end of the ensuing October, forming, in consequence of its summer tillage, the best possible preparation for wheat again, if you choose it. This is what cannot be done by the means of any other routine of crops."

"In short, without the corn, the land cannot by any means, be made to produce more than two-thirds of what it might be made to produce by the cultivation of corn, as one of the great crops of a farm.

"A crop of wheat, therefore, may be grown one year, and a crop of corn the next year on good land, which is not wet land, and this may be continued for any number of years, with a less portion of manure than is usually required in the present course of

crops. Observe, too, that this corn-planting comes after all the rest of the seed-season is over; it gives a little more employment for another month; it keeps the labourers busy, and that, too, in the most pleasant season of the year, when they would otherwise have little or nothing to do."

These directions, it should be noted, apply more especially to Cobbett's own variety. For other kinds which ripen early, it would be safer to defer the sowing till the beginning or middle of June, so as to give the plant throughout its whole growth, the very best part of our summer, and insure an unchecked development and a full bearing. "There are two ways of placing or ranging the plants upon the ground, one in rows, and the other in hills. Corn likes a free circulation of air as well as all the sun that it can get; and if it be tall, the best way certainly is to place it in hills, for that gives air to all the plants, and prevents the shading which rows produce." As, however, the dwarf kinds are alone recommended for English tillage, we will here consider only the former method.—Cobbett's distances were eight inches apart *in* the row, and the rows themselves three feet apart, which gives to each plant precisely two square feet of ground. But this space, he inclines to think, is not quite sufficient to afford the good summer ploughing, which should be given as a main thing in the cultivation of maize; moving the ground deeply near the plants while they are

growing. He likewise found, that the three feet distance was not wide enough for a cart to pass along the intervals, during the process of cutting and bringing home the tops, to be afterwards described. But if it be considered desirable to increase the width of the rows to four or five feet; the seeds then may be sown close to each other in the row, say seven or six inches; a plan which would probably cause a much greater crop to be produced than with the intervals previously given. Or, with the summer tillage and harvesting of the tops in view, there might be double rows of corn two feet asunder, sown with seed six inches apart, with intervals of five feet between the double rows. This would give one plant upon every one and three quarters of a square foot of ground.

These directions apply only to the sowing of large fields. With respect to small plots of ground, which might be conveniently cultivated by the spade, and from which the tops and blades could be more easily harvested, the intervals might well be three feet or two feet and a half, and the distances of the plants six or seven inches, because each plant could be readily attended to. The narrow intervals, therefore, will be convenient for adoption by cottagers in their gardens or little plots of land; which they will surely apply to this use instead of planting potatoes, when they discover that a quarter of an acre of ground may be made to fatten a couple of hogs, and afford much good food for their family besides.

We now proceed to the *act of planting*, which is a matter of importance, for unless this be done properly you have not the due number of plants, nor will they, as they should, come up altogether. And first, as to the seed, this should be selected from the largest and best formed ears; those at the end being rejected as less perfect. They should not be taken off until they are wanted for sowing, and then steeped in water to soften them. It would probably be advisable to steep them in brine, and dry them in quick lime, as practised with wheat, for maize is stated by some to be subject to smut and brand, as well as the latter grain; but this is stoutly denied by Cobbett.

“If you plant in rows (to follow our guide) you must make a drill, which may be made by a drill plough, or by almost any of those things which are now in such general use in the business of drilling. The ground ought to be ploughed, at its last ploughing, into lands of about five feet and a half wide. This, besides being a guide to the driller, would be an advantage, especially in shallow land, as it would give the plants an additional thickness of good soil to stand upon. Having this infallible guide, the ploughman or driller would find no difficulty in going straight from one end of the field to the other; and even if the drills were drawn with the corner of a hoe, the drill drawer would require no other guide, than the meeting of the two furrows at the top of the land. As to the labour of drawing these little



shallow drills, one man, with a sharp-cornered hoe, would draw the drills over several acres in one day. Care must be taken that the drills be not *too deep*; and that there be no holes in them from the pulling up of clods; and that they be smooth or nearly so, at the bottom, so that the corn may be deposited at an equal depth all the way along the drill. It is like the planting of kidney beans, and as much care should be taken about it." When the drill is made the planter succeeds, who must drop the seed at the proper distances, or as nearly so as may be, so as to avoid gaps. For this purpose, Cobbett used a stick marked with the distances required and of a convenient length.

"After the planter, comes a man with a little hoe to cover the seeds over with the earth; and this is a nice part of the business, especially if the ground be *cloddy*; for none but fine earth should lie directly upon the top of the seeds. The earth should not be more than an inch and a half deep upon the seeds; but it should be pressed a little upon the seeds, either with the hoe or with the foot. Two men, one to plant and the other to cover, would do three acres a day in the month of April, and more in the month of May. A man with a hoe would draw the drills of four acres in a day in the single row fashion; so that here is as small an expense as the sowing of any sort of grain, be it what it may, even if the drills be drawn by hand. If you have two rows, the labour will be pretty nearly double."

But our cultivator strongly recommends from experience as a preferable mode, that of *transplantation* instead of sowing. It is in his opinion the best and cheapest plan, as well as the surest way to produce the earliest and largest crops. It is also attended with the advantage of allowing the planting to be made safely so late as the third week in June. It will be unnecessary to transcribe his directions respecting the making of seed-beds, or of the manner of transplanting the young plants. Every farmer who has raised early lettuces and transplanted cauliflowers knows how to go to work with the one; and on the other, it suffices to say, that every acre to be planted is computed to require six or seven rods of ground, the grains being drilled in at four inches apart each way. If sown in the beginning of April, protected from the frost, which is an easy matter, and hoed between the rows when fairly up, the plants will be ready by the middle of May, and about half a foot high. They may be safely, however, transplanted when stouter, and about a foot in height, indeed until the middle of June. "At all events (he concludes) a rod or two of plants ought to be raised in beds, in the manner above described, for the purpose of filling up *gaps* that may be found, in spite of every precaution, in a field which has been planted with grain; for, in order to have the largest crop that can possibly be raised, effectual means must be used to prevent any deficiency in the number of plants."

As to the *summer tillage*, we pass over the war with birds, slugs, and hares, and the other open or insidious foes of the farmer when they attack his crops in the germ, and come to the weeds, which he thus somewhat happily describes:—"Let us now suppose the corn plants to be three inches high. Long before this, *weeds* will begin to appear; for they were in the ground long before the corn, and they claim their right of primogeniture, and act upon that right. They will not rise to the same height with the corn plants; but their inferiority in point of height and bulk, will be amply made up for in numbers; and the poor corn plant, if left to itself, will soon be a Gulliver, when bound down by the Lilliputians."—"Therefore, as soon as the plants are of the height just mentioned, you take a small hoe, with sharp corners, and hoe all the ground on both sides of the row of plants, to the distance of six or eight inches, and at a time when the ground is *not wet*. Take care to *move all the ground* between the plants, so that all the young weeds be destroyed. If there be *two rows* on the land, the two feet between them must be all hoed. No one, who has not actually seen the effect of this work, can form an idea of its efficacy. Great is its effect upon all young plants; but, in no other case, as far as I have observed, nearly so great as in that of corn.—After this hoeing, which, if you plant in mid-April, will take place early in May (and so vary according to

the sowing), the plants will soon be from six to eight inches high; and, the weeds, as if resolved to make up for the loss of their slaughtered brethren, will push on, in crowds innumerable, over all the rest of the ground. Now, therefore, the *plough* must begin to move, not only for the destruction of the weeds, but for the furnishing of *fresh food for the plants*."

As to the manner of ploughing, every agriculturist will understand how to proceed, regulating it according to his practice of farming and the nature of his land. The system adopted by Cobbett was Tull's husbandry, of which he was a great admirer, and perhaps with much reason. He adds, "thus ends the first ploughing, after which you will see the plants push away at a prodigious rate. The effect of this moving of the earth deeply between standing crops can be known to very few, except Market Gardeners; unless to those who have seen the effect, or have carefully read the book of Mr. Tull."

"The second ploughing must be regulated, in point of time, not so much by the period of the year, as by the age, the height, and the state of the plants. About the middle of July, or earlier, if you plant early, the plants will be about a foot and a half, or from that to two feet high. The tassel, or blossom head, will, about the middle of July, begin to make its appearance. At the same time, the ears begin to show themselves, forming in the socket of the blades, on the sides of the stalk. When you see the

tassel begin to rise above the sockets of the upper blades, it is a good time to plough again; for by this time rains have, perhaps, battered the ground, and given time for the weeds to make a fresh start. After this last ploughing is completed, the *earthing up* takes place; which is performed by a large hoe, drawing, from the middle of the interval, earth sufficient to hill up the stalks of the plants to the height of six or seven inches above the level of the ground where they stand. But, before you perform this earthing up, you must *sucker* the plants, and, this is a matter which requires a full explanation.

“Each plant will send out from the bottom of the stalk, just where it meets the ground, one, two, three, four, or more *suckers*. These must be taken off by pressing the bottom ends of them downwards, so as to leave to each plant nothing but a single stalk. The suckers, if strong, will bear ears themselves, sometimes, and indeed, generally, if not always, if the plants be strong; but, in the first place, those who have cultivated corn for a century and a half, always take off the suckers. In the next place, the ears which come upon these suckers are almost always very small; are necessarily *more backward* than the ears of the main stalk; cause the crop to ripen unequally, and unnecessarily deduct from the size and goodness of the ears upon the main stalk.” “The earthing up answers two purposes, first it keeps the plant stiff and steady in case of rough winds. Blow-

ing down is out of the question, but it is desirable that the plant should not even lean. It is laid or lodged by no storms—it stands erect under all the rains and winds which occur in America, although there the plant is tall: it bends or leans a little sometimes, but is never beaten down.—The other purpose is to give a fresh stock of roots, for the corn-plant, like the hop-bind, sends out, when earthed up, new roots from the bottom of the part thus covered with the earth."

By these quotations and references it will be seen, that the author cited is most particular and precise in his directions, respecting his pet plant. They are left to the consideration and discretion of the practical reader. It will be expedient now to turn to the observations of another authority\* on this subject, which is thus presented in a summary form, with the remark that they seem applicable particularly to the large tall varieties, but generally to all:—

"The distances between the rows of maize vary from two to four feet. In good ground the latter distance has produced the heaviest crop. The seed is sometimes sown in the furrow after the plough, and sometimes put in with a dibble. The latter seems the best way; and, as the rows are wide, and the seeds need not be put in nearer than a foot apart in the rows, an acre will be soon dibbled by hand. Two or three inches deep is sufficient to make the

\* Penny Cyclopædia—Art. Maize.

seed germinate readily. In warm moist climates the plant is very soon above ground. In fine weather, and when the seed has been steeped, it will be above ground in five or six days. When the plants are three or four inches out of the ground, and no frost is feared, they are thinned out to two feet apart, and in very rich soils three feet is better. In this case three or four ears may be expected to ripen on each stalk. In thin soil on a retentive subsoil, the earth is raised in ridges, or, what is better, in mounds, by crossing the ridges with the plough, and three or four seeds are put into each hillock, which are two or three feet apart. As the plants rise only one, or at most two are left in each hillock, and the earth is carefully moulded up to the stems; thus a deep dry bed is provided for the plant, and there is sufficient moisture from the impervious subsoil. This method might perhaps be adopted with advantage in England. Maize, however sown, must be repeatedly hoed. At the first hoeing the plants which are too close are pulled up, and where there is a deficiency, they are planted in: at least, this is the practice in Europe; but in America the general practice is to plant fresh seeds in the vacant places. When the plants are a foot high, there is a second hoeing, the weeds are then cut up, and some earth is drawn towards the plants and raised around the stems. The reason of this is that there are several joints very near each other at the bottom of the

stem, and from each of these fibres strike out into the soil which is brought into contact with it, and form additional roots to the plant, as they do from the crown of the roots of wheat. When the flowers are ready to expand, a third hoeing is given, to kill weeds and open the surface of the soil slightly. The earth which is raised around the stems should be flattened a little at top, and even slightly hollowed out near the stem, to collect the dews and rains in dry seasons. If any tillers or shoots appear from the bottom of the stem, they should be carefully removed, as they diminish the nourishment which should go to the main stem. A fourth hoeing and earthing up, at the time the seed begins to swell, is useful, but seldom given, for fear of unnecessary expense. In many countries they sow or plant various vegetables in the intervals between the rows of maize, of which the most advantageous are turnips and cabbages, which may be sown or planted between the maize, after the last hoeing. French beans, except they be dwarfs, are not so proper, as they shade the maize, and prevent its maturity. In warm climates cucumbers and melons are often raised there."

"The time of flowering is very critical for the maize: a cold, damp atmosphere may make a great part of the crop fail. In situations where this is to be feared, it is safe to sow maize at several times, with a week's interval. Thus the risk is divided, and it is not so likely that the whole crop will be in flower in ungenial weather."



The importance of fine weather during the period of blossoming, is not, as it is well known, confined to maize, it is equally a critical stage in the growth of wheat and other crops. Our attention has been already directed to this subject, and it remains only to urge the fact, as further proving the expediency of selecting such kinds of Indian Corn, and choosing the time of sowing, in order to provide as far as may be for this contingency. Nothing need be added to this chapter, it requires no explanation, its precepts are plain, and comment is reserved for the conclusion of our case.\*

\* The note to which reference has been made here in Chap. 2, appears in the next, page 142.

## CHAPTER VII.

ON THE MANAGEMENT OF MAIZE WHILST GROWING, AND THE MANNER OF HARVESTING AND STORING THE CROP; WITH THE MODE OF CULTIVATING IT FOR FODDER, AND CONCLUDING OBSERVATIONS.

We propose to resume, without preface, our practical notices on the culture of Indian Corn, by a consideration of the treatment of the plant, from the attainment of its full growth, to the completion of its maturity.

The topmost flowers just as they expand, being as we have previously explained an excellent food for cattle, it is usual in many places to cut off a great portion of them for such a purpose. If this be done judiciously, there is perhaps little danger; a sufficient number being left to afford pollen for the fructification of the ears below. One, in a square of about fifteen feet, is considered sufficient. And then, after the seed has set, it is customary to cut off the whole of the tops, down to near the base of the highest ear, which includes the upper leaves, for a similar purpose. But although sanctioned by custom, this practice is not to be reconciled with principle, and cannot be recommended. The wound thus

made bleeds, and much of the sap is lost, besides as the leaves serve to elaborate the sap, and assist its circulation, it would be better to leave them to grow until the grains have reached their full size, and are hardening. This latter course was Cobbett's custom, which we will proceed to consider ; observing further, with respect to the partial excision of the staminiferous flowers before expansion, that this is likewise a hazardous interference with nature's laws, and safer in the breach than in the performance.

"The *season for topping* (in the manner now to be advised) is not to be fixed on by the months, or by the days of the month, any more than the time for cutting wheat, or for taking off the ears of Indian Corn, is to be fixed on by such rule. The time for topping is, when upon stripping the husks open, a little at the tops of the ears, you find the grains to be hard ; not hard enough to grind ; not dry ; but hard enough to resist the strong pressure of the thumb-nail. A second criterion is, all the farina having completely quitted the *tassel*, and the tassel being completely dead and dry. A third is, the perfect deadness of the ends of the silk, where, instead of the bright green that appeared before gracefully hanging down, you will perceive it to be a little contemptible bunch of withered-up and brown-looking stuff. When all these signs appear, the top and the *blades* have performed their office, and the sooner they are taken away the better ; because,

after this, they do no good, and only serve to retard the ripening of the ears by the exclusion which they cause to the sun and the wind.

The *act of topping* is a simple affair, and performed with a sharp knife. It is usual also at the same time to cut, or strip off the leaves from the whole stem; but this appears to be also a questionable proceeding. The produce thus obtained is laid down in the intervals in convenient parcels and left to dry. They are afterwards tied up into small bundles, and in due time stacked with the thick ends outermost. Corn-tops have this advantage over hay, that the whole field need not to be cut at one time; it may be a fortnight, or even a month in hand, for though it would be best to cut the whole at once, when the plants are in their proper state; yet no great injury will ensue from the protraction, if the weather should be wet or unfavourable. The farmer may choose his time, both for topping and housing. Generally the application of the tops and blades, is that of giving them as food to sheep in the winter, and to horses and cattle in the spring. All these animals will eat them clean up, even to the stoutest part of the tops, relishing them on account of the sweetness contained in every part of the plant.

When the maize is fully ripe, the sheath of the ear opens at the apex, and appears quite dead, the outside of the husk also then turns white, and the grains will be found quite hard. The ears are at this stage

fit to gather. They are twisted off, or rather stripped off by a downward motion of the hand, and carted at once from the field, or if the weather permit, laid in heaps in a dry situation. They are turned occasionally to prevent the husks from becoming musty, and are then brought in and put down under a shed, or on a barn floor, as a protection against the wet, and for the convenience of husking.

The *stripping of the husks* from the ears, is generally performed by children and women. The huskers seat themselves around a large heap of ears, having baskets placed before them. The husks are stripped down and then twisted off at the tail end; these the huskers fling behind them and throw the ears into the basket, which are afterwards taken away by others, as they are filled. The under ears or "nubbings" are then sorted from the head ears, to be given to the pigs, whilst the latter are stored away in a dry place.

Cobbett recommends small granaries or corn cribs to be constructed, to stand upon stones, or on posts covered with tin (or zinc) as a protection against rats and mice. The ends and sides should not be boarded, but lathed, with interstices, just too narrow to let out a full ear of corn; in order to obtain a free circulation of air. He gives the dimensions as two feet at the bottom, five feet high up the sides to the eaves, and five feet across at the top.

Husking the ear is most usually adopted, as here

described, before it is stored, that is if the grain be fully ripe; but it is in some places housed, in the state in which it is gathered, it being considered that the corn keeps better in the sheath, a result certainly true, if the ear has not *fully* ripened on the stalk.

The operation of *shelling the corn*, that is, separating the seeds from the cobb, is rather a laborious operation if performed by hand; but it may be effectually accomplished, and in America often is so, by machinery. It is seldom thrashed by the flail, it being more easily shelled, and with less waste, by scraping the ear over a vessel placed to receive the grains. The following is Cobbett's description of the process:—"They take a piece of iron that has a sharpish edge to it, and fix it across a pretty broad tub, they then take an ear in their two hands, and scraping it longways across this piece of iron, the grains fall into the tub, and they throw the cobb aside. A stout man, with strong wrists, will shell from twenty to thirty bushels a day in this manner, and the American farmers generally do it in cold weather, in the winter, and most commonly choose the fire side as the scene of operation." He calculates that a bushel of ears should yield about half a bushel of grains.

The extraordinary increase of this corn has been already stated in chapter 2nd as ranging from a thousand to three thousand fold (that is increase), but this of course exhibits rather, what the different varie-

ties of the plant are capable of producing, when fully developed and under favorable circumstances, than the average of a crop grown in large quantities, as an agricultural produce; but even in that case it is, as will be shewn, extremely prolific. Lest this calculation should seem an over-statement, a reference to facts may be desirable. From Cobbett's experiments, it appears that several of the plants, which he grew in England, bore five, six, and seven ears on one stalk,\* averaging about 285 grains on one ear; but four ears only at 250 each would yield a thousand. Similar results of productiveness are also recorded by the nurseryman at Bayswater, referred to in chapter four. He states, "I had one plant with eleven ears, several with nine and ten, and a great many with seven and eight ears each." This, although a dwarf

\* With reference to such instances of fertility, the following remarks have come under the writer's notice, since going to press. Parkhurst in his *Hebrew and English Lexicon* (p. 605) observes, that "there is a species of wheat called Egyptian, which, having had some of it in my own garden, I have often seen and examined, and which bears 6 or 7 ears, shooting from the main ear in the middle. But had this been represented in Pharaoh's dream, the Hebrew expression, I think, would have been 7 ears coming up, or growing (not on one stalk) but on one ear; and therefore, I rather regard the object of Pharaoh's dream as an instance of one of those discordant images, which never existed in nature." Had the mind of the learned divine been directed to the subject of our criticisms, contained in the 2nd chapter; it cannot be doubted that he would have found a natural solution to the difficulty, presented by the common understanding of the text, without being driven to substitute another and a discordant difficulty in its place.

variety, may be considered as a mean in its produce. Again, on the authority of the Penny Cyclopædia, the largest ears of American Corn contain at least 800 grains; five ears of this variety would consequently produce four thousand; the above estimate, therefore, as it was intended to be, is within the extreme range to which, by high cultivation, this extraordinary grass is capable of rewarding the cultivator. There are travellers, it is true, who give a different account of the averages afforded by the Mexican and South American varieties, which are stated at from less than 200 fold\* (that is 400 increase) to 800 fold (1600.) These are given as the actual results of South American tillage, but the return made by the sorry farmers of that continent, can be no guide on the question we are discussing—we must be directed to a right conclusion by the labours of a people, deserving the name of agriculturists; and the produce of the United States farmers, with the trials of Cobbett, supply a fairer, as it is a truer, criterion. As both these authorities lead to a similar result, and we have shewn the increase *per plant* of the kind grown by the latter, this division of our

\* "Fold," in its strict and primary sense, means "double," and is thus defined by Johnson; but it has acquired a meaning synonymous with increase simply, and is so used in our version of the Bible—That this should be found in a book of such thoroughly Saxon-English is somewhat singular. In the German dialects it seems still to retain its original teutonic sense. Humboldt and Meyen appear thus to use the term.



chapter may be concluded, with a summary of the produce *per acre*, yielded by his crop in 1828.

Having measured out a rod of the standing corn and gathered the ears, he found them to yield four gallons and three quarts exclusive of the under ears, which gives 95 bushels to the acre. The full and fair ears contained upon an average between 270 and 300 grains in each, that is excluding the "nubbings," which, although inferior in size, are as good in quality as those of the head ears. "Here then, with all the defects, which were many and great in the tillage and management, is a most valuable crop, more than *three times the value* of the average crop of wheat; not to mention the loads of good fodder: and, not to mention, the fine state in which the crop leaves the land; not to mention, either, that this crop is not six months\* upon the ground, and that it may follow or be followed by a crop of wheat, without danger to either crop. My crop, supposing it to be eight hundred bushels of shelled corn (allowing that three of the acres which had been destroyed out of the eleven, were not to be counted,) and supposing the corn to yield forty-five pounds of flour per bushel, we know that corn makes more bread and more pudding or more cake, pound for pound, than wheat flour does; and we know that fifty-six pounds of wheat-flour, make seventy-three pounds of bread; these

\* In some of the dwarf varieties it would not be more than three or four months.

eight acres of mine would, if thus applied, have made upwards of *eleven thousand four-pound loaves*; more than three times the quantity, nay, more than *five* times the quantity, that could this year on an average be made out of the produce of eight acres of wheat."

"To compare the *worth* of this crop with that of other crops, we are not to content ourselves with its value in itself, but are to consider all its great advantages over other crops as to the *time required for its growth*; the security of it against wet harvests; the state in which it may safely find, and that in which it will necessarily leave the land; and must never omit the circumstance, that it may and must frequently render a bad crop of wheat, or a bad wheat harvest of little consequence to the country. Such would have been the case this very year (1828) if corn had been generally cultivated in England. The wheat crops are frequently injured and greatly diminished in their amount, by the wire-worm, the slug, or the floods; and wheat fields are, on account of these injuries, often ploughed up and sowed with barley or oats, or kept for turnips. Here is so much *bread* lost; but if *corn* came to supply the place of ploughed-up wheat, all would be well again; the quantity of bread would suffer no diminution. Corn is subject to *no smut*; to *no blight*; *no mildew*; and never suffers, as wheat does, from *too much rich-*

ness in the ground. Wheat will not stand this excess of richness; it will run all to blade; it will fall down; it must be 'flagged,' or it will bear no grain. This is never the case with *corn*, which will bear any richness of land.

"Then, again, the quantity of seed is so small in the case of corn, that it really does not make from the crop a deduction worthy of notice. We all know, that, to get on an average *twenty-eight bushels* of wheat, we must sow *three bushels*. Now, to get an acre of corn of from *fifty* to a *hundred bushels*, there needs only about *six quarts* of seed. We know, that, after every harvest, the *seed market* stops, in a great degree, the supply of bread-wheat, and that it takes away the very best part of the crop of wheat; and we know, that there is such a fuss about seed-wheat, sending miles and miles for it; and, indeed, the pains, though necessary, are endless. In the case of corn, in a good large pair of great-coat pockets, a farmer may carry seed for a corn-field home from his neighbour's crib, if he take a fancy to that in preference to his own. No man, after the third or fourth year from this, will ever *buy* seed-corn, such a thing was never heard of in America, and it never will be heard of here."

"But, if this plant be a valuable acquisition to the higher and middle ranks, what is it to the *labourer*? He *must* and *will* have the great benefit of it. It is

out of nature, that he should continue to plant and to eat potatoes."

Another practical subject remains for notice, to redeem the writer's engagement, and complete the task which he has assigned to himself, the cultivation of maize as a green crop for cattle. A use for which it will be admitted without hesitation, that it may be most advantageously grown throughout England and Ireland. It has been already stated, that no plant gives so great a mass of green food as this, in quality or quantity. If the seeds of the *largest* kinds, which should always be chosen for *this* purpose, were sown in April a crop might be mown in September, or as Young states, with regard to French varieties, the sowing might be in June and the cutting in August. In either case it would yield an admirable fodder for every kind of cattle. It does not spring up again like the common meadow grasses upon being cut; but if it be sown early a second crop could be obtained the same year, and where the land will admit of irrigation, the growth of the maize would be most rapid and luxuriant. When grown with this object, it should of course be sown thickly. The time to cut it, is, when the head flowers are just appearing out of the sheath, in which they are enveloped in the early stage of their growth. How valuable would such herbage be to us in dry seasons!

The following large varieties are recommended as suitable for these, as they may be termed, meadow purposes; the "white pearl corn," a large and luxuriant variety, which yields a rich and succulent herbage, and would produce a crop of considerable value to the farmer for the supply of fodder for his cattle. Four kinds from Pennsylvania, called the "Large Yellow," "Large Red," "Large Yellow Flint," and "Large White Flint," are well known and suitable for forage. They are grown throughout the middle states of North America. The introduction of these would likewise be desirable with a view of ultimately acclimating them for culture as grain. The "sweet corn" also might be rendered available for green food, not only for cattle but man. For the latter purpose, as a culinary vegetable, it is at present principally used in the lieu of peas in a dry season. In a word, there would be no difficulty in obtaining seed for sowing, with the object now before us, either from the American or European Continent; and the growth for such a purpose would be an excellent mode of adapting valuable varieties for field culture, by saving in favorable seasons and situations, a few plants to perfect their seeds.

Meyen states, that several varieties of maize, which are distinguished by extraordinary height and great beauty of leaf, are grown in the gardens of

Prussia, and are a valuable addition to ornamental plants. In South America the varieties are endless, and in hot and fertile parts, as at some points of Northern Chili, maize plants not unfrequently attain the height of ten and fifteen feet.

In reference to this valuable department of husbandry in the South of France, Young states that there "the climate permits it so late, that such sowing is always for an after-crop: and never done except after the reaping of some other produce. Such practices should convince us of the superiority of the southern climates; and ought to instigate the farmers in our northerly ones to emulate these examples as closely as possible by adopting the principle, though they may not have (as he supposed) the power to transfer the plant." As, however, this supposition is erroneous, and we may grow the very plant, the practice itself can be adopted, and the profit derived in its fullest extent."—In another part of his work he observes on this head, after stating that "as a grain the crop is on an average double the quantity commonly reaped of wheat. It is also sown thick to mow for soiling, after the harvest of other grain, which is the most profitable, and, indeed, admirable husbandry. It might be sown (for this purpose) in England the first week in June, and mown in the end of August, time enough to catch a late crop of turnips, or as a preparation for wheat."

It is said that maize exhausts the land;\* it would be extraordinary if a crop yielding such a heavy return in the whole plant, did not draw largely upon the elements of the soil, but is not this both natural and desirable? Where is the utility, to say nothing of the philosophy, of keeping the fertility and richness of the earth shut up in the field; it is like burying gold in the ground. The art of farming consists in drawing out the virtues of the soil, changed by the chemistry of vegetation, into a product we can use; to eliminate the juices of an esculent from a clod. The more we produce, the better for the producer, if only *what* we produce luxuriantly can be converted into *food*. In this view, maize will most liberally repay the farmer for the manure, which he may use to restore the humus consumed by its growth; *for every part of this large plant, its ears, its leaves, its stalk, is excellent food for man or beast*, in the various forms and applications pointed out in a preceding chapter. In this in truth consists the sum of the whole matter, and as such it is earnestly pressed upon the attention of the landowner, the farmer, and the labourer. It is presented to them as a produce that will yield, at the lowest estimate, double the return of wheat, acre for acre, at an equal expense for manure; and a considerably greater avail-

\* Young observes on this subject, that "it is a question; wheat succeeds it, which ought to imply that it is not an exhausting crop."

able increase, in return for the extra culture bestowed upon it.\* It is offered as a substitute for potatoes, on which we can no longer rely, and than which, it affords a more abundant and preferable food for the people; that is to say, as a substitute for a *main* crop, not to the exclusion of our old tuberculous friend as an adjunctive vegetable; for when in a healthy condition, it undoubtedly provides a good accompaniment to meat, although it has now become notorious that it is not a suitable food for the million.

It is generally admitted that the potato has been much overrated in its nutritive qualities; it now appears that its value has been estimated too highly both in regard to the return it yields per acre, if all the costs attending it be calculated, and to the amount of food afforded per pound compared with other products. Father Mathew, in a letter lately published, seems to support the one, and Mr. Joseph Martin,† in his letter to "The Times" of last December, establishes the other. He affirms it to be in this view inferior to oatmeal, in the proportion of 180lbs. to 720lbs. of food produced from 240lbs. of the raw article, and to maize as 180lbs. is to 1,200lbs.

\* The return is usually stated in corn-growing countries as from 40 to 60 bushels per acre; it has been shewn that 100 has been obtained in England.

† See note to "Homany" in chap. 5.



The difference in nutrition is equally considerable in favour of maize, and in the relative cost is stated to be in the proportion of seven to two.

Another value of this plant consists, in its supplying a crop, with which to improve the present routine of tillage; and it is suggested that it might be advantageously employed by our Norfolk farmers either as a substitute or an addition in their excellent "four-course system."

Besides the causes already suggested, as having postponed the fulfilment of Cobbett's prognostications, it may be added, that there was in his day, no such *demand* for the article, as has suddenly and sadly arisen in ours, no such *taste* for it, as has been created by the still pending emergency. Here, then, are incentives sufficient to put in activity greater skill, greater care, and a greater outlay of capital than the culture of a plant already proved to succeed, would even require. The agricultural societies could not perhaps, at this crisis, perform a greater service to the country, and for the interest of the classes entrusted to their charge, than by an instant attention and energetic course of action in this matter. Were each to form itself into a committee of enquiry and direction, the best application of the advice here afforded might be attained; if each would at once take measures for the procuring of sufficient seed of those varieties, which would be desirable for immediate cultivation, the

spring would not pass without a valuable deposit being made in our fields, to yield in its season enough, with God's blessing, to feed the hungry of a now starving nation.\*

Moreover, whether we look to England or to Ireland, a most singular coincidence of contingencies presents itself.—In the latter unhappy island, great alarm too reasonably prevails on account of the madness, or extremity of the people, which has caused them recklessly to abandon the culture of their fields, and goaded by starvation, to neglect all future prospects for present help. But a remedy is at hand in the ensuing Spring, this evil may be averted; let the people be supplied with seed maize and be incited to sow it. The potato need not be bewailed with such a substitute in prospect. What else indeed remains to be done at this crisis, than to sow a grain so apt in its season, and serviceable in its applications? That the climate of the agricultural districts of Ireland would suit the corn, there is much reason to conclude; it is moister and milder than the general temperature of our own island; and the peculiar richness of many of its green fields would accord with the habits of the plant. How serviceable then would be a supply of

\* It is also suggested that our horticulturists should set apart some considerable portion of their gardens for the immediate sowing of the dwarf varieties with the object of acclimating the plants and providing a supply of suitable seed for more general cultivation.

seed-corn in this extremity to Ireland, and what prudent and well-bestowed liberality it would prove, were a portion of the funds, now being generally raised by English benevolence, applied to the procuring of this needed article; providing thus for the future, as well as present wants of the Irish.\*

Again, with respect to our own country, alarm has been justly caused by what threatens, in a degree, to be a plague of rats. In the Midland counties—in all, it is stated, in which game has been much preserved, the rats, which have been long observed to increase, have this winter been found more generally to abound. In many districts, the hedges and banks swarm with them, and are riddled by their runs. Hundreds are killed in a day, ferrets have become in extensive demand, and rat-catchers now find their calling a lucrative and laborious employment.

The immediate cause of so great an influx of these destructive creatures, in the stack yards, is doubtlessly attributable to the severity of the present winter, and the consequent scarcity of food; but whence the existence of such multitudes? It is thought, with a high degree of probability, that the natural fecundity of this tribe of rodents has, for a series of years, remained unchecked in conse-

\* It appears that the course here suggested has been already considered by some of the committees, and it is hoped will be generally adopted.

quence of the destruction of their natural enemies, (the several species of the weasel tribe), for the preservation of game; a new and formidable evil has hence in an unexpected manner arisen to illustrate the working of our game laws. The mischief caused by these rats has not been confined to the ricks of corn, but has extended to the destruction of the young wheat now in the germ.

It is reported that a considerable degree of injury has been already in this way committed by them; that whole rows, for they gnaw it in a regular line, disappear in a night, and where unchecked, the rats have most materially injured the crop. In this emergency, the Indian Corn auspiciously presents a remedy, the time of its sowing as we have seen, does not arrive till the month of May or June, and will thus afford the farmers a most seasonable opportunity of renewing their damaged crops, by planting their fields with maize in every place in which their wheat has been destroyed, be it by rats or the frost.

Need the subject be further urged? is it necessary to enforce the stubborn facts, which have been adduced? or does it not suffice in conclusion, merely to direct the reader's common sense to the statements, the proofs, the conclusions, contained in this appeal to reason and to practice? We ought, it is true, to have earlier learned the lesson, now bitterly taught us. We have had many warnings, from many quarters within the last twenty years, that the potato

could not be depended upon. An evident degeneration has time after time pointed to this conclusion, but hitherto without any practical effect. In 1845, all England and the potato provinces of Europe, rang with the intelligence, that a general blight had wasted the fields, and disease destroyed the crops, on which millions depended for subsistence. The leaves were smitten, and the tubers, deprived of their vital energy, rotted in the ground. Great was the distress, many the fears, and much was said and written on the subject, searching for the cause, and suggesting remedies ; but what was practically *done* to remedy the disaster ? Forewarning is only forearm- ing when action follows. How was the evil sought to be averted for the future ? what substitute provided and planted ? Pregnant as these questions are of life and death, the past affords no satisfactory reply. Astounding as the reality now seems, the great fact was treated as if it had been but an exciting fiction ; the sensation abated, and with a temerity and blindness unparalleled, the selfsame course was thoughtlessly followed, which has led to such a threatening result ; the potato in an increased degeneracy was committed to the ground, with a senseless trust, that all would be well again, that what had so fearfully and so often failed, bankrupt for a dozen times, would come up sound and strong. Few if any increased the culture of our peas, parsnips, beet root, or jerusalem artichokes as substitutes ; but the

old prejudice prevailed, and the reed on which we leaned has again pierced our hand. To what is such conduct comparable? save to the infatuation of the Neapolitans, who with the ruins of Herculaneum and Pompeii beneath their feet, and the traditions of their suffocated fathers in their memories, still cling to the site of their swallowed cities and build on the lava which covers them. What folly can exceed it? save that of the crazed or deluded Irish, who have abandoned their fields to the usurpation of their bogs; and starving from the effects of past imprudence, risk the substitution of an utter destitution in future, for the present scarcity. The last blow has driven home the nail; and now we stand, as all who neglect admonitions, stand, amazed at our position. There is left but one course to pursue, to shut our eyes no longer, to the facts, nor our understanding to the consequences; to remove our reliance from that which has so totally failed us, and instantly and zealously to supply its place with a worthier substitute. The Indian Corn which is now feeding the immediate sufferers from the calamity which has befallen us, is brought prominently to our notice, it is put into our hands; let us cast it into the ground, that it may bring forth abundantly, and stay the cry of the hungry; "give us seed that we may live and not die and that the land be not desolate." Let us depend no longer upon the Potato, but cultivate the Maize. No

substitute is more suitable or more easy to obtain ; no product could be found more worthy our care and consideration ; none capable of repaying our skill or capital so largely ; none yielding a greater return, or more excellent food, and none, when once in possession of our fields, which we should be less willing to lose, than the corn which feeds a large section of the human family " within a wider range of climate than any other species of grain."

If the present humble attempt, to direct public attention to this important question, should in any way be instrumental in effecting the consummation desired, the writer's object will be obtained, and the employment of his leisure hours rewarded. He has ventured to give publicity to his views, and he now ventures in conclusion to urge his readers to test them by experiment ; commending for their motto, the exhortation from the " old play"—

" Enimvero Dave! nihil loci est segnitie neque socordie."

THE END.

## ERRATA.

Page 6, line 5 from bottom, for "graminivorous," read "graniferous."

„ 9, line 4 from top, for "meager," read "meagre."

„ 16, line 7 from bottom, for "insidious," read "insidious."

„ 23, line 2, for "later," read "latter."

„ 38, last line, for "sheathes," read "sheaths."

„ 39, last line, for "later," read "latter."

„ 47, line 5, dele "a."

„ 47, line 14, for "has," read "have."

„ 85, line 6, for "rigorous," read "vigorous."

„ 110, line 8, for "affords," read "afford."



